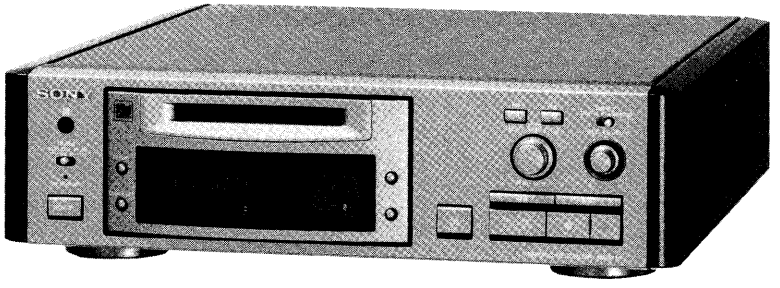
MDS-S1

SERVICE MANUAL

AEP Model
UK Model
Singapore Model
Tourist Model



Model Name Using Similar Mechanism	MDS-302
Mechanism Type	MDM-2A
Base Unit Type	MBU-2
Optical Pick-up Block Type	KMS-210A/J-N

SPECIFICATIONS

MD recorder section

System	MiniDisc digital audio system
Disc	MiniDisc
Laser	Semiconductor laser
Wavelength	780 - 790nm
Laser diode properties	Material: GaAlAs Emission duration: continuous Laser output: less than 44.6 μW (This output is the value measured at a distance of 200 mm from the lens surface on the optical pick-up block.)
Revolutions	400 rpm to 900 rpm (CLV)
Error correction	Advanced Cross Interleave Reed Solomon Code (ACIRC)
Sampling frequency	44.1 kHz
Modulation system	EFM (Eight-to-Fourteen Modulation)
Number of channels	2 stereo channels
Frequency response	5 to 20,000 Hz ± 0.5 dB
Signal-to-noise ratio	Over 98 dB (during playback)
Wow and flutter	Below measurable limit

Inputs

	Jack type	Input impedance	Rated input	Minimum input
LINE IN	Phono jacks	Over 47 kilohms	500 mVrms	158 mVrms
DIGITAL IN	Square optical connector jack	Optical wave lenghth 660 nm	—	—

Outputs

	Jack type	Rated output	Load impedance
LINE OUT	Phono jacks	2 Vrms (at 50 kilohms)	Over 10 kilohms
DIGITAL OUT	Square optical connector jack	−18 dBm	Wave length: 660 nm
HEADPHONES	Stereo mini jack	28 mW	32 ohms

— Continued on next page —

MINIDISC RECORDER

SONY®

General

Power requirements

Where purchased	Power requirements
AEP model	220 - 230 V AC, 50/60 Hz
UK model	220 - 240 V AC, 50 Hz
Singapore model Tourist model	110 - 120, 220 - 240 V AC, 50/60 Hz

Power consumption
20 W

Dimensions (approx) (w/h/d)
280×82.5×286.5mm incl. projecting parts

Mass (approx)
2.4 kg

Supplied accessories
Audio connecting cords (2 phono plugs – 2 phono plugs) (2)
Optical cable (1)
Audio (AU) bus cable (1)
Remote commander (remote) RM-D3M (1)
Sony SUM-3 (NS) batteries (2)

Optional accessories
Recordable MDs: MDW-60 (60 min), MDW-74 (74 min)

U.S. and foreign patents licensed from Dolby Laboratories Licensing Corporation.

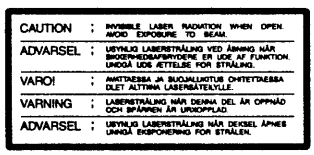
Design and specifications are subject to change without notice.

The laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

CLASS 1 LASER PRODUCT
LUOKAN 1 LASERLAITE
KLASS 1 LASERAPPARAT

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

The following caution label is located inside of the recorder.


CAUTION : INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO! : AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA LASERSÄTEILYLLE.
VARNING : LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD.
ADVARSEL : USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN.

CAUTION
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

TABLE OF CONTENTS

Section Title Page

SECTION 1. GENERAL 3

SECTION 2. DISASSEMBLY
2-1. Case 17
2-2. Front Panel Assembly 17
2-3. Mechnism Deck 18
2-4. Slider Assembly 18
2-5. Base Unit and Loading Motor ASSY 19
2-6. Slider Assembly Mounting 19

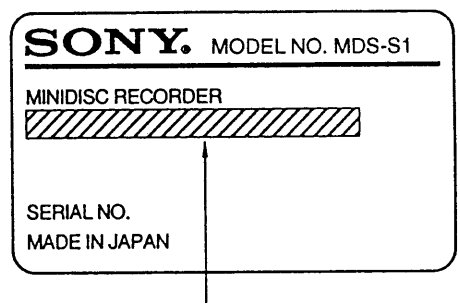
SECTION 3. DIAGRAMS
3-1. IC Pin Functions
• IC101 RF Amplifier (CXA1981R) 20
• IC121 Digital Signal Processor, Digital Servo Processor, EFM/ACIRC encoder/ decoder (CXD2535AR) 21
• IC201 System Controller (M37610MD-052FP) 24
• IC221 Shock-Proof Memory Controller, ATRAC Encoder/ Decoder (CXD2536R) 27
3-2. Circuit Boards Location 29
3-3. Printed Wiring Board — RF Section — 30
3-4. Schematic Diagram — RF Section — 33
3-5. Schematic Diagram — Digital Section — 37
3-6. Printed Wiring Board — Digital Section — 41
3-7. Schematic Diagram — Display/Power Section — 45
3-8. Printed Wiring Board — Display/Power Section — 49
3-9. Semiconductor Lead Layouts 52

SECTION 4. EXPLODED VIEWS
4-1. Case and Front Panel Section 54
4-2. Chassis Section 55
4-3. Mechanism Section (MDM-2A) 56
4-4. Base Unit Section (MBU-2) 57

SECTION 5. ELECTRICAL PARTS LIST 58

MODEL IDENTIFICATION

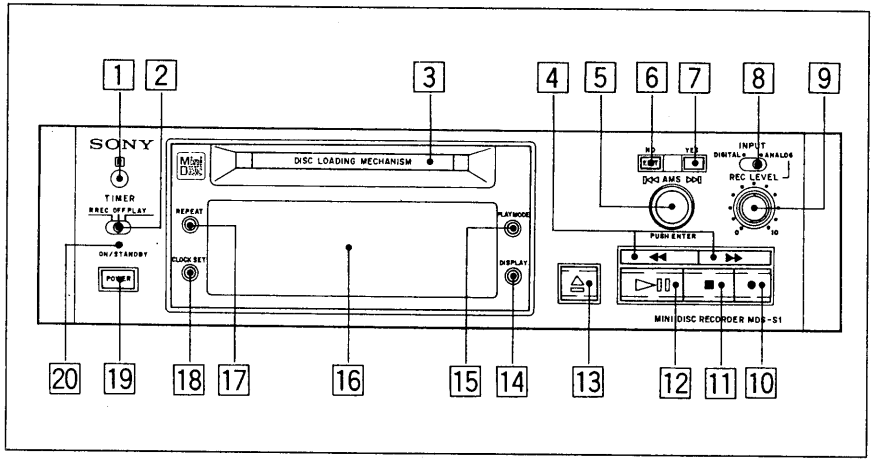
— Specification Labels —



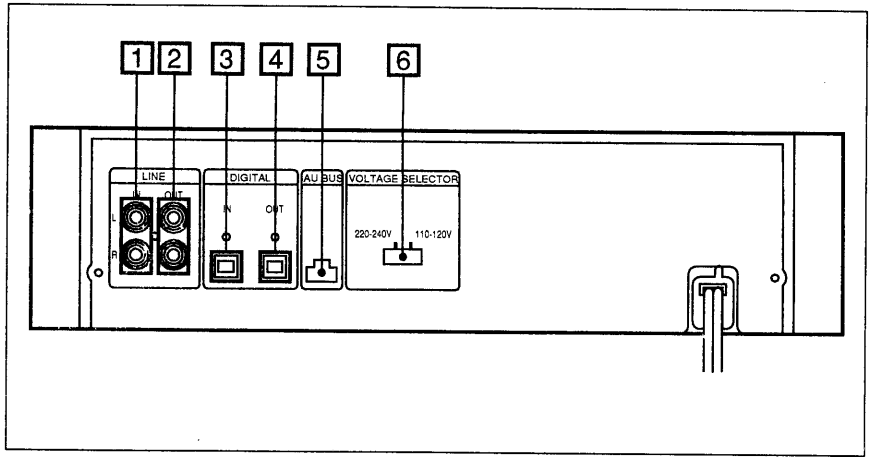
AEP model : AC : 220 — 230V ~ 50/60Hz 20W
UK model : AC : 220 — 240V ~ 50/60Hz
Singapore, Tourist model : AC : 110 — 120, 220 — 240V ~ 50/60Hz 20W

Looking at the Controls

Front Panel



Rear Panel



1 Ⓡ (Remote sensor)
2 TIMER switch
3 DISC compartment
4 ◄◄ ►► (search) buttons
5 *AMS dial
6 EDIT NO button
7 YES button
8 INPUT selector switch (DIGITAL/ANALOG)
9 REC LEVEL control
10 ● REC (recording) button
11 ■ (stop) button
12 ▷II (play, pause) button
13 ⏏ EJECT button
14 DISPLAY button
15 PLAY MODE button
16 Display window
17 REPEAT button
18 CLOCK SET button
19 POWER switch
20 ON/STANDBY indicator

*AMS : Automatic Music Sensor

1 LINE IN jacks (pin jack)
2 LINE OUT jacks (pin jack)
3 DIGITAL IN jack (optical jack)
4 DIGITAL OUT jack (optical jack)
5 AUBUS
6 VOLTAGE SELECTOR switch (Singapore, Tourist model only)

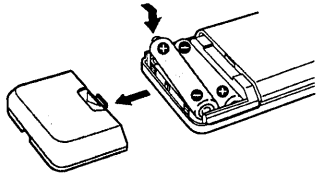
Getting Started

Unpacking

Check that you received the following items:
- Audio connecting cords (2)
- Optical cable (1)
- Audio (AU) bus cable (1)
- Remote commander (remote) (RM-D3M) (1)
- Sony SUM-3 (NS) batteries (2)
- M3×6 screws (4)

Inserting batteries into the remote

You can control the recorder using the supplied remote.
Insert two R6 (size AA) batteries by matching the + and – on the batteries. When using the remote, point it at the remote sensor ▣ on the recorder.



When to replace batteries
With normal use, the batteries should last for about six months. When the remote no longer operates the recorder, replace all the batteries with new ones.

Notes
- Do not leave the remote near an extremely hot or humid place.
- Do not drop any foreign object into the remote casing, particularly when replacing the batteries.
- Do not expose the remote sensor to direct sunlight or lighting apparatuses. Doing so may cause a malfunction.
- If you don't use the remote for an extended period of time, remove the batteries to avoid possible damage from battery leakage and corrosion.

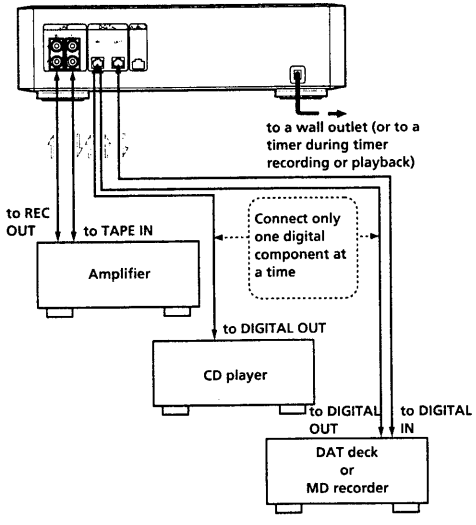
Detaching the side panels

If you choose to remove the side panels from the unit, do not reinsert the side panel screws into the cabinet holes. Use the shorter M3×6 screws (supplied) instead. For safety's sake, disconnect the mains lead from the AC outlet before inserting the M3×6 screws into the cabinet holes.

Hooking Up the System

Overview

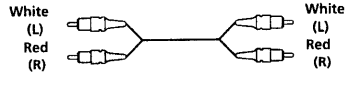
This section describes how to hook up the MD recorder to an amplifier or other components such as a CD player or DAT deck. Be sure to turn off the power of each component before connection.


to a wall outlet (or to a timer during timer recording or playback)
to REC OUT
to TAPE IN
Amplifier
Connect only one digital component at a time
to DIGITAL OUT
CD player
to DIGITAL OUT
to DIGITAL IN
DAT deck or MD recorder

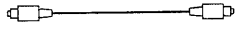
⇒: Signal flow

What cords will I need?

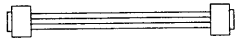
- Audio connecting cords (supplied) (2)



- Optical cable (supplied) (1)

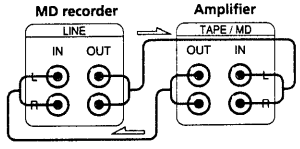


- Audio (AU) bus cable (supplied) (1)



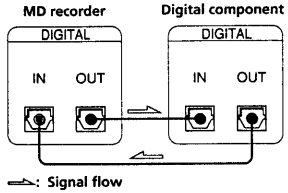
Hookups

- **Connecting the recorder to an amplifier**
Connect the amplifier to the LINE IN/OUT jacks using the audio connecting cords (supplied), making sure to match the colour-coded cord to the appropriate jacks on the components: red (right) to red and white (left) to white. Be sure to make connections firmly to prevent hum and noise.



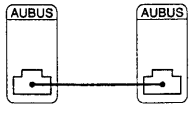
⇒: Signal flow

- **Connecting the recorder to a digital component such as a CD player, DAT deck, digital amplifier, or another MD recorder**
Connect the component through the DIGITAL IN/OUT connectors using the optical cable (supplied). Take off the cap and plug in the optical cable.



⇒: Signal flow

- **Connecting the recorder to a Sony preamplifier (TAE-S1), integrated stereo amplifier (TA-S2)*, compact disc player (CDP-S1), Mini Hi-Fi Component System (MHC, FH Series, etc.) or other components equipped with an AU BUS connector**
Use only the AU bus cable to connect the component. This connection allows you to do Synchro-Recording with a Sony CD Player and a variety of other operations. Be sure that each end of the cable is firmly inserted into the respective AU BUS connector.



* For more information on the availability of the TA-S2, contact your nearest Sony dealer.

Notes
- Digital programme sources with different sampling frequencies cannot be recorded through the digital input jack.
Only CD, MD (premastered) and DAT sources with a sampling frequency of 44.1 kHz can be recorded through the digital input connector. "Din Unlock" appears in the display when you attempt to record digital programme sources with a sampling frequency different from that of the MD (such as 32- or 48-kHz DAT or BS). To record these programme sources on an MD you must connect them through the analogue LINE IN jacks and set INPUT to ANALOG.
- If "Cannot Copy" appears in the display, recording through the digital jack is not possible.
In this case, record the programme source through the LINE IN and OUT jacks with INPUT set to ANALOG.

Connecting the mains lead

Connect the mains lead to a wall outlet or to the outlet of a timer.

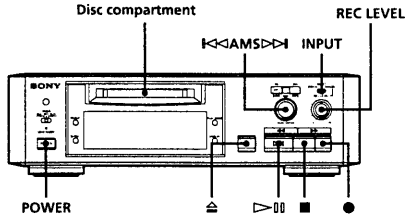
Note
With the exception of a timer outlet, do not connect the mains lead to a switched outlet.

Where do I go next?

Now you're ready to use your recorder.
Before using the MD recorder, turn on the amplifier and select the MD recorder with the source selector on the amplifier.

Recording on an MD

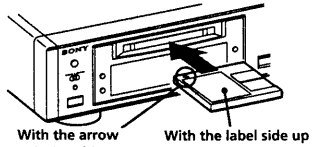
Before you begin, make sure you have correctly and firmly connected the recorder to an audio component such as an amplifier or CD player as indicated on page 5.



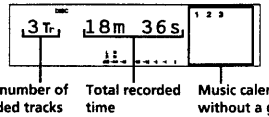
1 Turn on the amplifier and the programme source, and set the programme selector on the amplifier to the programme source.

2 Press POWER to turn on the recorder.
The ON/STANDBY indicator changes from red to green.

3 Insert the recordable MD with the label side up and the arrow pointing toward the opening into the disc compartment until the recorder grips it.
If you insert the MD while the recorder is off, the recorder will turn on automatically and "Welcome" will appear in the display.



The total number of recorded tracks, total recorded time, and music calendar without a grid appear in the display.



4 Set INPUT according to the input terminal connected to the programme source.

When you want to record through	Set INPUT to
LINE IN	ANALOG
DIGITAL IN	DIGITAL

5 Locate the position on the MD where you want to start recording.
- To record on a new (blank) recordable MD, skip this step, and go to Step 6.
- To start recording from the end of the last recorded track, go to Step 6, or turn AMS (or press ⏮ or ⏭) until "End" appears.
- To record over an existing track, turn AMS (or press ⏮ or ⏭) until the number of the track to be recorded over appears.

6 Press ●.
The recorder is now ready for recording.
- If you are recording from the end of the last recorded track, or using a new recordable MD, "New" alternates with the remaining time indication in the display.
- If you are recording over an existing track, "TRACK" flashes and "Overwrite" alternates with the remaining time indication in the display.

7 When you've set INPUT to ANALOG in Step 4, turn REC LEVEL to adjust the recording level. (The fourth dot is satisfactory for most purposes. However, for a more precise adjustment, see "Adjusting the Recording Level" on page 8.)

8 Press ⏯ (or ►) to start recording.

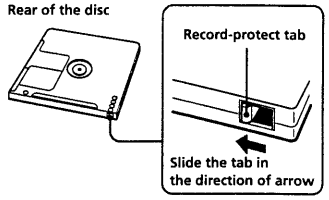
9 Start playing the programme source you want to record.

10 After finishing, press ■ to stop recording. Then press ⏏ to remove the MD or press POWER to change the recorder to standby.

To	Press
Pause*	⏯ (or ❚❚)
Resume recording after pause	⏯ (or ► or ❚❚)
Remove the MD	⏏

* Whenever you pause recording, the track number increases by one. For example, if you paused recording while recording on track 4, the track number increases by one and recording continues on the new track when restarted.

To protect a MiniDisc against accidental erasure
To make it impossible to record on an MD, slide the tab in the direction of arrow, opening the slot. To allow recording, close the slot.



You can start recording from the middle of a recorded track in Step 5
Press ⏯ (or ►) to start playback, press ⏯ (or ❚❚) where you want to start recording, and then do the procedure starting from Step 6 on page 6. However, you will not be able to record from the middle of a recorded track if "PROGRAM" or "SHUFFLE" appears in the display.

Notes on Recording

If "Protected" appears in the display
The MD is record-protected. Close the slot to record on the disc (see "To protect a MiniDisc against accidental erasure" on this page).

If "Din Unlock" appears in the display
- The programme source is not connected to DIGITAL IN even though you've selected DIGITAL in Step 4 or the sampling frequency of the programme source does not match that of the MD recorder (44.1 kHz). To continue, connect the programme source through DIGITAL IN or select ANALOG in Step 4 to record through LINE IN.
- The digital signal has been interrupted (stopped) while you were recording. To continue recording, restart the digital programme source. To stop recording, press ■ on the MD recorder.

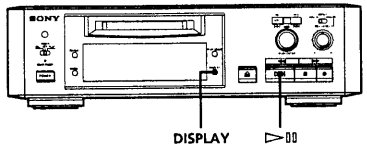
Depending on source being recorded, track numbers are marked in the two following ways:
- When recording from a CD or MD with INPUT at DIGITAL and the source connected to DIGITAL IN, the recorder automatically marks track numbers in the same sequence as the original. However, if a track is played more than once (i.e., by repeated playback during programme play or single-track repeat play), the same track is marked as a single track no matter how many times it is played.
If the source is an MD, track numbers may not be marked for tracks of less than 4 seconds.
- When INPUT is at ANALOG, the source connected through LINE IN, and the "LEVEL-SYNC" setting OFF (see "Marking Track Numbers While Recording" on page 9) or when recording from DAT with INPUT at DIGITAL and the source connected through DIGITAL IN, the source will be recorded as a single track. You can divide the track afterwards using the Divide Function (see "Dividing Recorded Tracks" on page 20) or mark track numbers during recording by using the Track Marking Function on page 9.
If "LEVEL-SYNC" appears in the display, the recorder automatically marks track numbers (see "Marking track numbers automatically" on page 9).

If "TRACK" flashes in the display
The recorder is recording over an existing track. "TRACK" lights continuously when the recorder reaches the end of the previously recorded portion.

When "TOC" flashes in the display
The recorder is currently updating the Table of Contents (TOC). Do not move the recorder or pull out the mains lead. Changes to an MD made through recording are saved only when you update the TOC by ejecting the MD or changing the recorder to standby by pressing POWER.

The MD recorder uses the SCMS (Serial Copy Management System on page 28)
MDs recorded through DIGITAL IN cannot be copied onto other MDs through DIGITAL IN.

Useful Tips for Recording



Checking the remaining recordable time on the MD

- When you press DISPLAY while recording, the remaining recordable time on the MD appears.
- When you press DISPLAY repeatedly while the recorder is stopped, the display changes as follows: total recorded time, remaining recordable time on the MD, disc name (see page 13).

If "Auto Cut" appears in the display

The Auto Cut Function has been activated. This happens when there is no sound input for more than 30 seconds while INPUT is at DIGITAL and the source connected through DIGITAL IN. The recorder changes to recording pause and the 30 seconds of silence are replaced by a blank of about 3 seconds.

If "Smart Space" appears in the display

The Smart Space Function has been activated. This happens when there has been an extended silence (of not more than 30 seconds) between two input signals when INPUT is at DIGITAL and the source connected through DIGITAL IN. The Smart Space Function instantaneously replaces the silence with a blank of about 3 seconds even as the recorder continues recording.

Playing back tracks just recorded

Do this procedure to immediately playback tracks that have just been recorded.

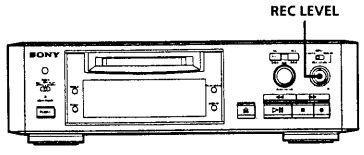
Press ⊳II (or ►) immediately after stopping recording.
Playback starts from the first track of the material just recorded.

To play from the first track of the MD after recording

1 Press ■ again after stopping recording.
2 Press ⊳II (or ►).
Playback starts from the first track of the MD.

Adjusting the Recording Level

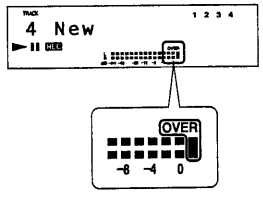
When recording a sound source while INPUT is at ANALOG and the source connected through LINE IN, use REC LEVEL to adjust the recording level before starting recording.



1 Do Steps 1 to 6 in "Recording on an MD" on page 6.

2 Play the portion of the programme source with the strongest signal level.

3 While monitoring the sound, turn REC LEVEL to adjust the recording level so that the peak level meters reach their highest point without turning on the OVER indication. Occasional lighting of "OVER" is acceptable.

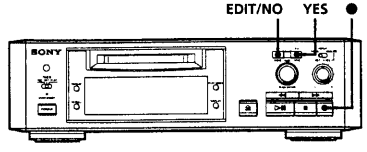


4 Stop playing the programme source.

5 To start recording, do the procedure starting from Step 8 of "Recording on an MD" on page 6.

Marking Track Numbers While Recording (Track Marking)

You can mark track numbers either manually or automatically. By marking track numbers at specific points, you can quickly locate the points later using the AMS Function or Editing Functions.



Marking track numbers manually (Manual Track Marking)

You can mark track numbers at any time while recording on an MD.

Press ● at the place you want to add a track mark while recording.

Marking track numbers automatically (Automatic Track Marking)

The recorder adds track marks differently in the following cases:

- When recording from CDs or MDs with INPUT at DIGITAL and the source connected through DIGITAL IN:
  The recorder marks track numbers automatically. When you record from a CD or MD, the track numbers are written as they are found on the original.
- When recording with INPUT at ANALOG and the source connected through LINE IN, or when recording from DAT with INPUT at DIGITAL and the DAT connected through DIGITAL IN:
  The recorder marks a new track number whenever the signal level drops and rises to a certain point* (Automatic Track Marking). If "LEVEL-SYNC" does not light up, set the LevelSync to ON as follows:

1 Press EDIT/NO to display "LevelSync ?"during recording or recording pause.

2 Press YES twice to display "LevelSync ON."
"LEVEL-SYNC" appears in the display.

To cancel Automatic Track Marking

1 Press EDIT/NO during recording or recording pause.
"LevelSync ?" appears in the display.
2 Press YES.
3 Press EDIT/NO.
"LevelSyncOFF" appears in the display.

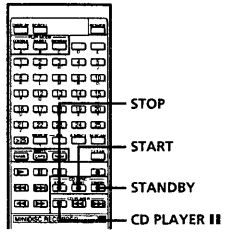
* The signal level must remain low for 2 or more seconds before a new track number is written.

When you want to mark track numbers after you've done the recording

Use the Divide Function (see "Dividing Recorded Tracks" on page 20).

Synchro-Recording With a Sony CD Player

By connecting your recorder to a Sony CD player or Mini Hi-Fi Component System, you can easily dub CDs onto MDs using the CD synchro buttons on the remote. If your recorder is connected to a Sony CD player by the optical cable through DIGITAL IN (digital input), tracks are automatically recorded in the same sequence as the original regardless of whether "LevelSync ON" or "LevelSyncOFF" is selected. If your recorder is connected to a Sony CD player by audio connecting cords through LINE IN (analogue input), tracks are automatically recorded when you select "LevelSync ON" (see "Marking Track Numbers While Recording" on page 9).
As the same remote controls both the CD player and the recorder, you may have trouble operating both units if they are far from each other. If you do, place the CD player close to this recorder.



1 Set the source selector on the amplifier to CD.

2 Do Steps 2 to 5 in "Recording on an MD" on page 6 to prepare the recorder for recording.

3 Insert a CD into the CD player.

4 Select the playback mode (shuffle play, programme play, etc.) on the CD player.

5 Press STANDBY.
The CD player pauses for playing and the recorder pauses for recording.

6 Press START.
The recorder starts recording and the CD player starts playback.
The track number and elapsed recording time of the track appear in the display.

If the CD player does not start playing
Some CD player models may not respond when you press START on the remote of the recorder. Press II on the remote of the CD player instead.

7 Press STOP to stop synchro-recording.

To pause recording
Press STANDBY or CD PLAYER II.
To restart recording, press START or CD PLAYER II.
A new track number is created each time you pause recording.

You can use the remote of the CD player during synchro-recording
Press ■.
The CD player stops and the recorder pauses for recording.
To restart synchro-recording, press ►.

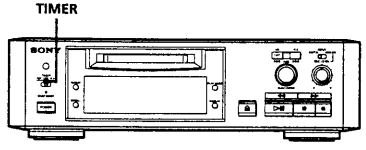
You can change CDs during synchro-recording
Do the following steps instead of Step 7 above.
You can also operate the recorder with the buttons on the front panel of the CD player when the recorder is connected through the AU bus cable to a Sony compact disc player (CDP-S1) or Mini Hi-Fi Component System (MHC, FH Series, etc.).
1 Press ■ on the remote of the CD player.
The recorder pauses for recording.
2 Change the CD.
3 Press ► on the remote of the CD player.
Synchro-recording restarts.

Track numbers are automatically marked during synchro-recording with a Sony compact disc player (CDP-S1) or Mini Hi-Fi Component System (MHC, FH Series, etc.) (see "Hookups" on page 5)
Track numbers are automatically marked whether "LEVEL-SYNC" lights up or not in the display.

You can check the remaining recordable time on the MD
Press DISPLAY (see page 8).

Recording on an MD Using a Timer

You can start recording on an MD at a preset time by connecting a timer (not supplied). Please refer to the instructions of the timer for further help.



1 Insert a recordable MD.

2 Set the programme selector on the amplifier to the source you want to record.

3 Set TIMER on the recorder to REC.

4 Set the timer to the time you want.
The recorder turns off. When the specified time arrives, the recorder turns on and starts recording.

5 After you have finished using the timer, set TIMER on the recorder to OFF. Then either plug the mains lead of the recorder into a wall outlet or set the timer to continuous on so that the recorder stays in standby status.

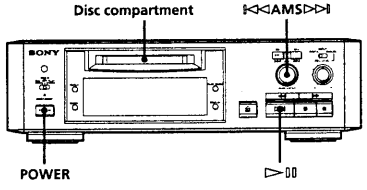
Make sure to change the recorder to standby status within two or three days after timer recording is completed
When the recorder enters standby, the TOC on the MD is updated and the recorded contents are written to the MD. If the recorder's standby status is off due to disconnection from a power source for more than two or three days, the contents recorded with the timer may disappear.

If "STANDBY" flashes when you change the recorder to standby status after timer recording is completed
The recorded contents have disappeared.

Notes
- If TIMER is left at REC, the recorder will automatically start recording the next time you turn the recorder on.
- During timer recording, new material is recorded from the end of existing material on the MD.
- Material recorded during timer recording will be saved to the disc the next time the recorder enters standby status. "TOC" will flash in the display at that time. Do not move the recorder or pull out the mains lead while "TOC" is flashing.
- Timer recording will stop if the disc becomes full.

Playing an MD

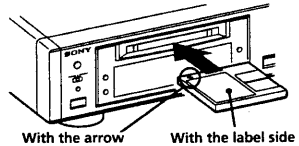
Before you begin, make sure you have connected the recorder to an amplifier correctly and firmly as indicated on page 5.



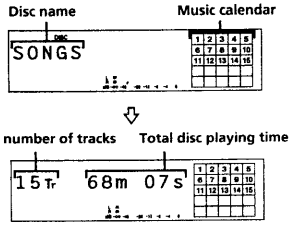
1 Turn on the amplifier and set the source selector to MD recorder.

2 Press POWER to turn on the recorder.
The ON/STANDBY indicator changes from red to green.

3 Insert the MD with the label side up and the arrow pointing toward the opening into the disc compartment until the recorder grips it.
If you insert the MD while the recorder is off, the recorder will turn on automatically.
"Welcome" appears in the display.



The disc name appears, followed by the total number of tracks (Tr) and total disc playing time. A music calendar showing all the track numbers appears within a grid if the MD is a premastered disc, or without a grid if the MD is a recordable disc.



If the total track number exceeds 25, ▶ appears to the right of number 25 in the music calendar.
To label a recordable disc and its tracks, see "Labelling Recordings" on page 23.

4 Press ▷II (or ►).
The MD starts playing.
The current track number, track title (if labelled), and elapsed playing time of the current track light up in the display.

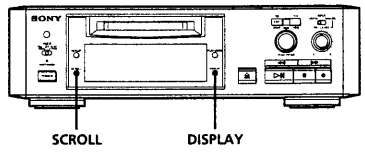
To stop playback
Press ■.

When you want to	Do the following:
Pause	Press ▷II (or II)
Resume play after pause	Press ▷II (or II or ►)
Go to the next track	Turn AMS clockwise (or press ▶▶I on the remote)
Go back to the preceding track	Turn AMS counterclockwise (or press I◀◀ on the remote)
Remove the MD	Press ⏏

You can locate and play back a track while the recorder is stopped
1 Turn AMS (or press I◀◀ or ▶▶I) until the number of the track you want to play appears.
2 Press AMS or ▷II (or ►).

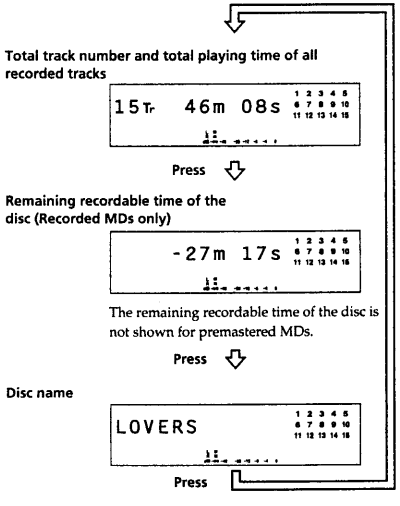
Using the Display

You can use the display to check disc and track information such as the total track number, total playing time of the tracks, remaining recordable time of the disc, and disc name in the display.



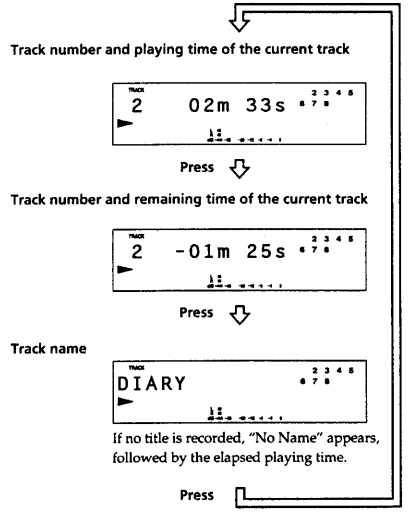
Checking the total track number, total disc playing time, remaining recordable time of the disc and the title of the disc

Each time you press DISPLAY while the recorder is stopped, you can change the display as follows:


Total track number and total playing time of all recorded tracks
15Tr 46m 08s
Press
Remaining recordable time of the disc (Recorded MDs only)
-27m 17s
The remaining recordable time of the disc is not shown for premastered MDs.
Press
Disc name
LOVERS
Press

Checking remaining time and the title of a track

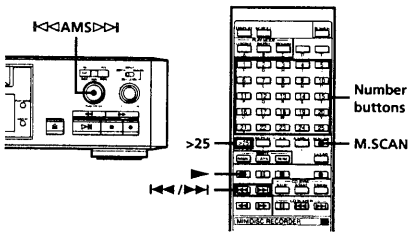
Each time you press DISPLAY while playing an MD, you can change the display as shown below. The track numbers in the music calendar disappear after they are played.


Track number and playing time of the current track
2 02m 33s
Press
Track number and remaining time of the current track
2 -01m 25s
Press
Track name
DIARY
If no title is recorded, "No Name" appears, followed by the elapsed playing time.
Press

You can check the track name at any time while playing an MD by pressing SCROLL
Since the display shows up to 12 characters at a time, press SCROLL again to see the rest of the track title if the title has 13 characters or more.
Press SCROLL again to pause scrolling, and again to continue scrolling.

Locating a Specific Track

You can quickly locate any track while playing a disc by using AMS (Automatic Music Sensor), I◄◄ and ►►I, number buttons or M.SCAN on the remote.



To locate	Do the following:
The next or succeeding tracks	Turn AMS clockwise or press ►►I repeatedly until you find the track
The current or preceding tracks	Turn AMS counterclockwise or press I◄◄ repeatedly until you find the track
A specific track directly	Press number buttons to enter the track number
By scanning each track for 6 seconds (music scan)	1 Press M.SCAN before you start playing. 2 When you find the track you want, press ► to start playing.

To pause playing at the beginning of a track
Turn AMS (or press I◄◄ or ►►I) after pausing playback.

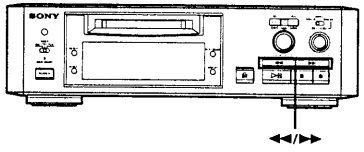
To go quickly to the beginning of the last track
Turn AMS counterclockwise (or press I◄◄) while the display shows the total track number and total disc playing time (page 13).

When you directly locate a track with a number over 25
You must press >25 first, before entering the corresponding digits.
Press >25 once if it is a 2-digit track number, and twice if it is a 3-digit track number.
To enter "0," press button 10.
Examples:
- To play track number 30
  Press >25 once, then 3 and 10.
- To play track number 100
  Press >25 twice, then 1, 10 and 10.

You can extend the playing time during music scan
While the recorder is stopped, press M.SCAN repeatedly until the playing time you want (6, 10 or 20 seconds) appears in the display. Each press changes the time in order of 6 to 20, then from 6 again.

Locating a Particular Point in a Track

You can also use ◄◄ and ►► to locate a particular point in a track while playing an MD or during playback pause.



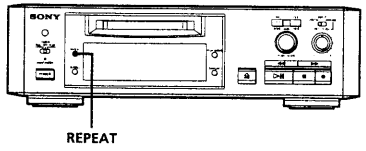
To locate a point	Press
While monitoring the sound	►► (forward) or ◄◄ (backward) and keep pressing until you find the point
Quickly by observing the display during playback pause	►► or ◄◄ and keep pressing until you find the point. There is no sound output during this operation.

If "OVER" appears in the display while you are pressing ►► during playback pause
The disc has reached the end. Press ◄◄ (or I◄◄) or turn AMS counterclockwise to go back.

Notes
- If the disc reaches the end while you are pressing ►► during sound monitoring, the recorder stops.
- Tracks that are only a few seconds long may be too short to scan using the search function. For such tracks, it is better to play the MD at normal speed.

Playing Tracks Repeatedly

You can play tracks repeatedly in any play mode.



Press REPEAT while playing an MD.
"REPEAT" appears in the display. The recorder repeats the tracks as follows:

When the MD is played in	The recorder repeats
Continuous play (page 12)	All the tracks
Shuffle play (this page)	All the tracks in random order
Programme play (page 16)	The same programme

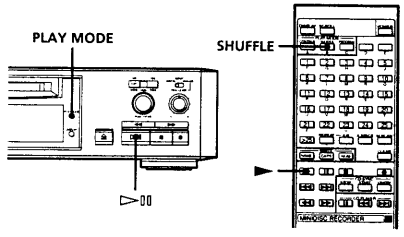
To cancel repeat play
Press REPEAT several times until "REPEAT" disappears.
The recorder returns to the original playing mode.

Repeating the current track

While the track you want to repeat is playing in continuous play, press REPEAT several times until "REPEAT 1" appears in the display.

Playing in Random Order (Shuffle Play)

You can have the recorder "shuffle" tracks and play them in random order.



1 Press PLAY MODE repeatedly (or SHUFFLE once) until "SHUFFLE" appears in the display.

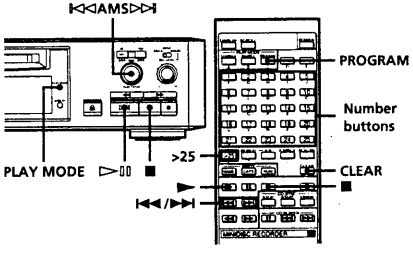
2 Press ▷II (or ►) to start Shuffle Play.
"🔀" appears in the display while the recorder is "shuffling" the tracks.

To cancel Shuffle Play
Press PLAY MODE repeatedly (or CONTINUE once) until "SHUFFLE" disappears.

You can specify tracks during Shuffle Play
- To play the next track, turn AMS clockwise (or press ►►I).
- To play from the beginning of the current track again, turn AMS counterclockwise (or press I◄◄). You cannot use AMS (or I◄◄) to go to tracks that have already been played.

Creating Your Own Programme (Programme Play)

You can specify the playback order of the tracks on an MD and create your own programmes containing up to 25 tracks.



1 Press PLAY MODE repeatedly (or PROGRAM once) until "PROGRAM" appears in the display.

2 Do either a) or b):

a) When using the remote

Press the number buttons to enter the tracks you want to program in the order you want.

To program a track with a number over 25, use the >25 button (see page 14).

If you've made a mistake

Press CLEAR, then press the right number button.

b) When using the controls on the recorder

1 Turn AMS until the track number you want appears in the display.

2 Press AMS or PLAY MODE.

3 Repeat Step 2 to enter other tracks. Each time you enter a track, the total programme time is added up and appears in the display.

4 Press ►II (or ►)to start Programme Play.

To cancel Programme Play

Press PLAY MODE repeatedly (or CONTINUE once) until "PROGRAM" disappears.

You can program the same track repeatedly

While the track number appears in the display, press AMS as many times as you want.

The programme remains even after Programme Play ends

When you press ►II (or ►), you can play the same programme again.

Note

The display shows "- - - -" instead of the total playing time when the total playing time of the programme exceeds 100 minutes.

Checking the track order

You can check the order of tracks in your programme during playback or playback pause.

Turn AMS (or press I◄◄ or ►►I) during playback or playback pause. The track numbers appear in the order they were programmed.

Changing the track order

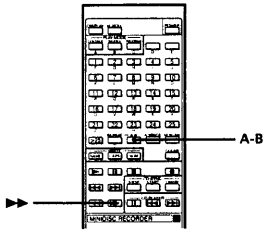
You can change the order of the tracks in your programme before you start playing.

To	Do the following:
Erase the last track in the programme	Press CLEAR. Each time you press the button, the last track will be cleared.
Add tracks to the end of the programme	Do the procedure on this page starting from Step 2.
Change the whole programme completely	1 Press ■ while the recorder is stopped. 2 Do the procedure on this page starting from Step 2.

Repeating a Specific Portion (A-B Repeat)

You can play a specific portion of a track repeatedly. This might be useful when you want to memorize lyrics.

Note that you can only repeat a portion within the boundaries of a single track.



1 While playing a disc, press A-B at the starting point (point A) of the portion to be played repeatedly.

"A-B" of "REPEAT A-B" flashes in the display.

2 Continue playing the track or press ►► until you reach the ending point (point B), then press A-B again.

"A-B" of "REPEAT A-B" lights continuously. The recorder starts to play the specified portion repeatedly.

To cancel A-B Repeat

Press REPEAT.

Setting new starting and ending points

You can repeat the portion immediately after the currently specified portion by changing the starting and ending points.

1 Press A-B while "REPEAT A-B" appears.

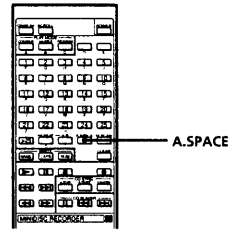
The current ending point B becomes the new starting point A and "A-B" of "REPEAT A-B" flashes in the display.

2 Continue playing the track or press ►► until you reach the new ending point (point B), then press A-B again.

"A-B" of "REPEAT A-B" lights continuously and the recorder starts playing repeatedly the newly specified portion.

Useful Tips When Recording From MDs to Tape

The Auto Space and Auto Pause Functions described in this section make recording from MDs to tape more easy.



Inserting blank spaces while recording to tape (Auto Space)

The Auto Space Function inserts a 3-second blank space between each track while recording from MDs to tapes, allowing you to use the AMS function during later playback.

Before the start of recording, press A.SPACE repeatedly until "A.SPACE" appears in the display.

To cancel Auto Space

Press A.SPACE repeatedly until "A.SPACE" disappears.

Note

If the Auto Space Function is on while recording a selection containing multiple track numbers, (for example, a medley or symphony), blank spaces will be inserted within the selection whenever the track number changes.

Pausing after each track (Auto Pause)

When the Auto Pause Function is on, the recorder pauses after playing each track. Auto Pause is convenient when recording single tracks or multiple, non-consecutive tracks.

Press A.SPACE repeatedly until "A.PAUSE" appears in the display.

To restart playback

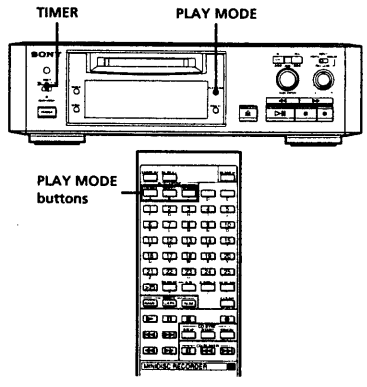
Press ►II (or II).

To cancel Auto Pause

Press A.SPACE repeatedly until "A.PAUSE" disappears.

Playing an MD Using a Timer

You can start playing an MD at a preset time by connecting a timer (not supplied). Please refer to the instructions of the timer for further help.



1 Press PLAY MODE repeatedly (or one of the PLAY MODE buttons once) to select the play mode you want.

2 Set TIMER on the recorder to PLAY.

3 Set the timer to the time you want.
The recorder turns off. When the specified time arrives, the recorder turns on and starts playing.

4 After you have finished using the timer, set TIMER on the recorder to OFF.

Notes

- You can select PROGRAM in Step 1. Note, however, that programmes eventually fade away when the standby status is off, and therefore if you set the time too far in the future, the programme may be gone when the specified time arrives. If this has occurred, the recorder enters CONTINUE mode at the specified time and the tracks play in consecutive order.
- If you select PROGRAM in Step 1 and set TIMER to PLAY while "TOC" appears, the recorder enters CONTINUE mode at the specified time and the tracks play in consecutive order.

Notes on Editing

If "Protected" appears in the display
The recorder could not erase the specified track because the record-protect slot on the MD is open. Erase the track after closing the slot.

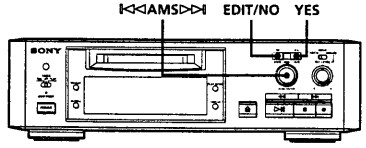
When "TOC" flashes in the display
Do not move the recorder or pull out the mains lead. After editing, "TOC" lights continuously until you eject the MD or turn off the power. "TOC" flashes while the recorder is updating the TOC. When the recorder finishes updating the TOC, "TOC"goes off.

Erasing Recordings (Erase Function)

Do the procedures below to erase following:

- A single track
- All tracks
- Parts of a track

Note, however, that once erased, MD data cannot be recovered.

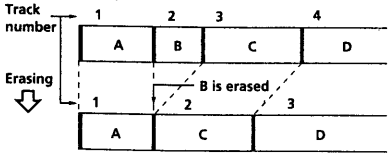


Erasing a single track

You can erase a track simply by specifying the respective track number. When you erase a track, the total number of tracks on the MD decreases by one and all tracks following the erased one are renumbered. Since erasing merely updates the TOC, there is no need to record over material.

To avoid confusion when erasing multiple tracks, you should proceed in order of high to low track number to prevent the renumbering of tracks that have not been erased yet.

Example: Erasing B



1 Turn AMS until the track number you want to erase appears in the display.

2 Press EDIT/NO repeatedly until "Erase ?" appears in the display.
The track number you selected starts flashing in the music calendar.

3 Press YES.
When the track selected in Step 1 has been erased, "Complete" appears for a few seconds and the total number of tracks in the music calendar decreases by one.
If you erase a track during playback, the track following the deleted track begins playing afterwards.

4 Repeat Steps 1 to 3 to erase more tracks.

To cancel the Erase Function
Press EDIT/NO, ■, or turn AMS to change the track number.

Note
If "Erase!! ?"appears in the display, the track was recorded or edited on another MD recorder and is record-protected. If this indication appears, press YES to erase the track.

Erasing all tracks on an MD

Erasing a recordable MD deletes the disc name, all recorded tracks and titles (see page 24).

1 While the recorder is stopped, press EDIT/NO repeatedly until "All Erase ?" appears in the display.

2 Press YES.
All tracks in the music calendar start flashing.

3 Press YES again.
When the disc name, all recorded tracks and titles on the MD have been erased, "Complete" appears for a few seconds and the music calendar disappears.

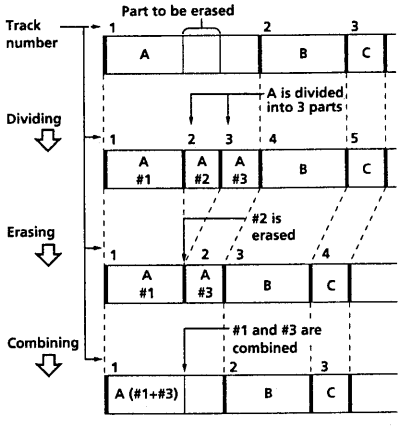
To cancel the Erase Function
Press EDIT/NO or ■.

Editing Recorded MDs

Erasing a part of a track

By using the Divide (see this page), Erase (see page 19) and Combine (see page 21) Functions, you can erase specific portions of a track.

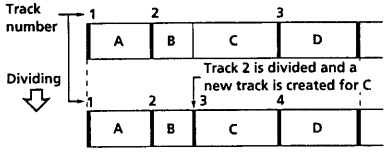
Example: Erasing a part of track A

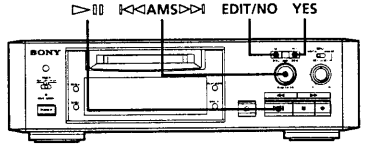


Dividing Recorded Tracks (Divide Function)

With the Divide Function you can assign a track number at places that you want to randomly access afterwards. Use this function to add tracks to MDs recorded from an analogue source (and therefore contain no track numbers), or to divide an existing track into multiple portions. When you divide a track, the total number of tracks on the MD increases by one and all tracks following the divided track are renumbered.

Example: Dividing track 2 to create a new track for C



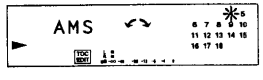


1 While playing the MD, press ⊳II (or ■) at the point where you want to create a new track.
The recorder pauses playing.

2 Press EDIT/NO repeatedly until "Divide ?" appears in the display.

3 Press YES to divide the track.
"Rehearsal" alternates with "Position ok?" in the display, the track to be divided starts flashing in the music calendar, and the starting portion of the new track begins playing repeatedly.

4 If the starting position is incorrect, press EDIT/NO.
(If it is correct, go to Step 7.)



5 While monitoring the sound, turn AMS to find the starting position of the new track.
The starting portion of the new track is played back repeatedly.
"Rehearsal" alternates with "Position ok?" in the display.
The starting position can be moved within a maximum range of –128 to +127 steps of about 0.06 second each within a track.

6 If the starting position is still incorrect, repeat Step 5 until it is correct.

7 Press YES or AMS when the position is correct.
When the track has been divided, "Complete" appears for a few seconds and the newly created track begins playing. The new track will have no track title even if the original track was labelled.

To cancel the Divide Function
Press ■.

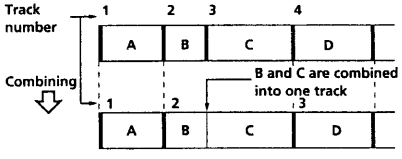
You can undo a track division
Combine the tracks again (see "Combining Recorded Tracks" on this page), then redivide the tracks if necessary.

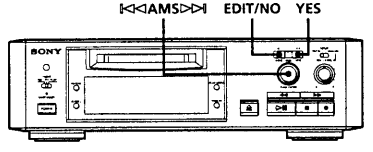
You can divide a track while recording
Use the Track Marking Function (see page 9).

Combining Recorded Tracks (Combine Function)

Use the Combine Function while the recorder is stopped, playing or in pause to combine consecutive tracks on a recorded MD. This function is useful for combining several songs into a single medley, or several independently recorded portions into a single track. When you combine two tracks, the total number of tracks decrease by one and all tracks following the combined tracks are renumbered.

Example: Combining B and C





1 Turn AMS until the second track of the two to be combined appears.
For example, when combining tracks 3 and 4, turn AMS until 4 appears.

2 Press EDIT/NO repeatedly until "Combine ?" appears in the display.

3 Press YES.
"Rehearsal" alternates with "Track ok?" in the display and the two tracks to be combined start flashing in the music calendar. The place where the two tracks will join (i.e., the end of the first track and the beginning of the second track) repeatedly plays back.

4 If the place is correct, press YES.
When the tracks have been combined, "Complete" appears for a few seconds and the total number of tracks in the music calendar decreases by one.
If both of the combined tracks have track titles, the title of the second track is erased.

To cancel the Combine Function
Press EDIT/NO or ■.

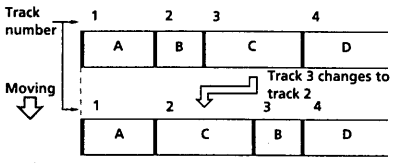
You can undo a track combination
Divide the tracks again (see "Dividing Recorded Tracks" on page 20), then repeat the combine function with the correct tracks if necessary.

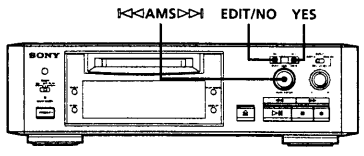
Note
If "Sorry" appears in the display, the tracks cannot be combined. This sometimes happens when you've edited the same track many times, and is due to a technical limitation of the MD system, not a mechanical error.

Moving Recorded Tracks (Move Function)

Use the Move Function to change the order of any track. After you move a track, the track numbers between the new and the old track positions are automatically renumbered.

Example: Moving track 3 to track position 2

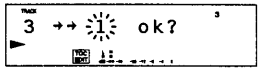




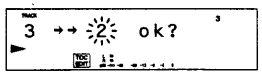
1 Turn AMS until the track number you want to move appears in the display.

2 Press EDIT/NO repeatedly until "Move ?" appears in the display.

3 Press YES.
The track number to be moved and the new track position appears.



4 Turn AMS until the new track position appears.

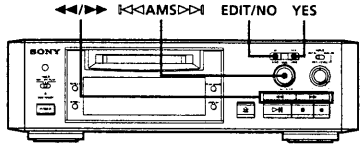


5 Press YES or AMS.
After you have moved the track, "Complete" appears for a few seconds and the moved track begins playing back if the recorder is in playback mode.

To cancel the Move Function
Press EDIT/NO or ■.

Labelling Recordings (Title Function)

You can create titles for your recorded MDs and tracks. Titles — which may consist of uppercase and lowercase letters, numbers and symbols for a maximum of about 1,700 characters per disc — appear in the display during MD operation.

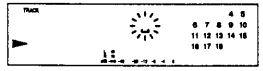


Use the following procedure to label a track or an MD. **You can label a track while it is playing, pausing or recording. If the track is playing, be sure to finish labelling before the track ends. If the track ends before you've completed the labelling procedure, the characters already entered are not recorded and the track will remain unlabelled.**

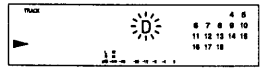
1 Press EDIT/NO repeatedly until "Name in ?" appears in the display, then do the following:

To label	Make sure that the recorder is
A track	Playing, pausing or recording the track to be labelled
An MD	Stopped

2 Press YES.
A flashing cursor appears in the display.



3 Turn AMS to select the first character.



The selected character flashes.
Letters, numbers, and symbols appear in sequential order as you turn AMS.
You can use the following symbols in titles:
! " # $ % & ' ( ) * + , – . / : ; < = > ? @ _ `

4 Press AMS to enter the selected character.
The cursor shifts rightward and waits for the input of the next character.

5 Repeat Steps 3 and 4 until you have entered the entire title.

If you entered the wrong character
Press ◀◀ or ▶▶ until the character to be corrected starts flashing, and repeat Steps 3 and 4 to enter the correct character.

To erase a character
Press ◀◀ or ▶▶ until the character to be erased starts flashing, then press EDIT/NO.

To enter a space
Press AMS or ▶▶ while the cursor is flashing.

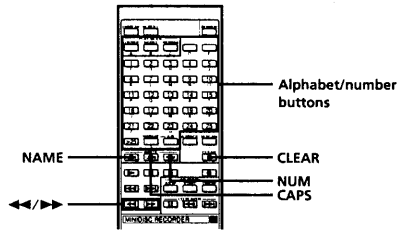
6 Press YES.
This completes the labelling procedure and the title appears on the left side of the display.

To cancel labelling
Press ■.

Note
You cannot label a track or an MD while you are recording over an existing track.

Labelling tracks and MDs with the remote

Use the following procedure to label a track or an MD with the remote.



1 Press NAME repeatedly until a flashing cursor appears in the display, then do the following:

To label	Make sure that the recorder is
A track	Playing, pausing or recording the track to be labelled
An MD	Stopped

(Continued)

2 Select the character type as follows:

To select	Press
Lowercase letters	CAPS repeatedly until "Selected abc" appears in the display
Uppercase letters	CAPS repeatedly until "Selected ABC" appears in the display
Numbers	NUM repeatedly until "Selected 123" appears in the display

3 Enter one character at a time.
After you enter a character, the cursor shifts rightward and waits for the input of the next character.

4 Repeat Steps 2 and 3 until you have entered the entire title.

If you entered the wrong character
Press ◀◀ or ▶▶ until the character to be corrected starts flashing.
Press CLEAR to erase the incorrect character, then enter the correct one.

5 Press NAME again.
The entered title appears on the left side of the display window after the label has been recorded.

To cancel labelling
Press ■.

Changing an existing title

1 Press NAME, then do the following:

To change	Make sure that the recorder is
A track title	Playing or pausing the track whose title is to be changed
A disc name	Stopped

2 Keep pressing CLEAR (or EDIT/NO on the recorder) until the current title is erased.

3 Enter the new title.
Do Steps 3 to 5 of "Labelling Recordings" on page 23, or Steps 2 to 4 of "Labelling tracks and MDs with the remote" on this page.

4 Press NAME.

Erasing all titles on a disc (Name Erase Function)

Use this function to erase all titles on an MD simultaneously.
Note that once erased, titles cannot be recovered.

1 Keep pressing EDIT/NO while the recorder is stopped until "All Erase ?" appears in the display.

2 Press EDIT/NO again. "Name Erase ?" appears in the display.

3 Press YES.
All titles are erased.

To cancel the Name Erase Function
Press ■.

You can erase all recorded tracks and titles
See "Erasing all tracks on an MD" on page 19.

Precautions

On safety
- As the laser beam used in this recorder is harmful to the eyes, do not attempt to disassemble the cabinet. Refer servicing to qualified personnel only.
- Should any solid object or liquid fall into the cabinet, unplug the recorder and have it checked by qualified personnel before operating it any further.

On power sources
- Before operating the recorder, check that the operating voltage of the recorder is identical with your local power supply. The operating voltage is indicated on the nameplate at the rear of the recorder.
- The recorder is not disconnected from the mains as long as it is connected to the wall outlet, even if the recorder itself has been turned off.
- If you are not going to use the recorder for a long time, be sure to disconnect the recorder from the wall outlet. To disconnect the mains lead, grasp the plug itself; never pull the cord.
- The mains lead must be changed only at the qualified service shop.

On operation
If the recorder is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lenses inside the recorder. Should this occur, the recorder may not operate properly. In this case, remove the MD and leave the recorder turned on for about an hour until the moisture evaporates.

On the MiniDisc cartridge
- Do not open the shutter to expose the MD.
- Do not place the cartridge where it will be subject to extremes of sunlight, temperature, moisture or dust.

On cleaning
Clean the cabinet, panel and controls with a soft cloth slightly moistened with a mild detergent solution. Do not use any type of abrasive pad, scouring powder or solvent such as alcohol or benzine.

If you have any questions or problems concerning your recorder, please consult your nearest Sony dealer.

Display Messages

The following table explains the various messages that appear in the display.

Message	Meaning
Blank Disc	A new (blank) or erased MD has been inserted.
Cannot Copy	An attempt was made to make a second copy from a digitally dubbed MD (see page 28).
Cannot EDIT	An attempt was made to edit the MD during Programme or Shuffle Play or the inserted disc contains Japanese characters.
Disc Error	The MD is scratched or missing a TOC.
Disc Full	The MD is full (see "System Limitations" on page 26).
Impossible	An attempt was made to combine tracks while playing back the first track.
Name Full	The titling capacity of the MD has reached its limit (about 1,792 characters).
NO DISC	There is no MD in the recorder.
No Track	The inserted MD has a disc title but no tracks.
Protected	The inserted MD is record-protected.
Retry	The first recording attempt failed due to a disturbance or scratch on the MD, and a second attempt is being made.
Retry Error	Due to vibrations to the recorder or scratches on the MD, several recording attempts were made but with no success.
Sorry	An attempt was made to combine tracks that cannot be combined.
STANDBY (flashing)	The latest material recorded was not saved correctly on the MD, or certain data, such as the previous playback conditions, were not saved.

System Limitations

The recording system in your MiniDisc recorder is radically different from those used in cassette and DAT decks and is characterized by the limitations described below. Note, however, that these limitations are due to the inherent nature of the MD recording system itself and not to mechanical causes.

"Disc Full" lights up even before the MD has reached the maximum recording time (60 or 74 minutes)
When 255 tracks have been recorded on the MD, "Disc Full" lights up regardless of the total recorded time. More than 255 tracks cannot be recorded on the MD. To continue recording, erase unnecessary tracks or use another recordable MD.

"Disc Full" lights up before the maximum number of tracks is reached
Fluctuations in emphasis within tracks are sometimes interpreted as track intervals, incrementing the track count and causing "Disc Full" to light up.

The remaining recording time does not increase even after erasing numerous short tracks
Tracks under 12 seconds in length are not counted and so erasing them may not lead to an increase in the recording time.

Some tracks cannot be combined with others
Track combination may become impossible when tracks are edited.

The total recorded time and the remaining time on the MD may not total the maximum recording time (60 or 74 minutes)
Recording is done in minimum units of 2 seconds each, no matter how short the material. The contents recorded may thus be shorter than the maximum recording capacity. Disc space may also be further reduced by scratches.

Tracks created through editing may exhibit sound dropout during search operations.

Track numbers are not recorded correctly
Incorrect assignment or recording of track numbers may result (1) when CD tracks are divided into several smaller tracks during digital recording, or (2) while recording certain CDs with the "LEVEL-SYNC" indication on (i.e., the automatic track marking function on).

"TOC Reading" appears for a long time
If the inserted recordable MD is brand new, "TOC Reading" appears in the display longer than for MDs that have been used.

Limitations when recording over an existing track
- The correct remaining recording time may not be displayed.
- You may find it impossible to record over a track if that track has been recorded over several times already. If this happens, erase the track using the Erase Function (see page 19).
- The remaining recording time may be shortened out of proportion to the total recorded time.
- Recording over a track to eliminate noise is not recommended since this may shorten the duration of the track.
- You may find it impossible to label a track while recording over it.

The correct recorded/playing time may not be displayed during playback of monoaural-format MDs.

Troubleshooting

If you experience any of the following difficulties while using the recorder, use this troubleshooting guide to help you remedy the problem. Should any problem persist, consult your nearest Sony dealer.

The recorder does not operate or operates poorly.
➡The MD may be damaged ("Disc Error" appears). Take the MD out and insert it again. If "Disc Error" remains, replace the MD.

The recorder does not play back.
➡Moisture has formed inside the recorder. Take the MD out and leave the recorder in a warm place for several hours until the moisture evaporates.
➡The recorder is not on. Press POWER to turn the recorder on.
➡The MD is inserted in the wrong direction. Slide the MD into the disc compartment with the label side up and the arrow pointing towards the opening until the recorder grips it.
➡The MD may not be recorded (the music calendar does not appear). Replace the disc with one that has been recorded.

The recorder does not record.
➡The MD is record-protected ("Protected" appears). Close the record-protect slot (see page 7).
➡The recorder is not connected properly to the sound source. Make connections properly to the sound source.
➡The recording level is not adjusted properly (in case of input through LINE IN). Turn REC LEVEL to adjust the recording level properly (see page 8).
➡A premastered MD is inserted. Replace it with a recordable MD.
➡There is not enough time left on the MD. Replace it with another recordable MD with fewer recorded tracks, or erase unnecessary tracks.
➡There has been a power failure or the mains lead has been disconnected. Data recorded to that point may be lost. Repeat the recording procedure.

An incompletely inserted MD cannot be pulled out.
➡The MD recorders self-lock system has gripped the MD. Insert the MD completely, then press ⏏.

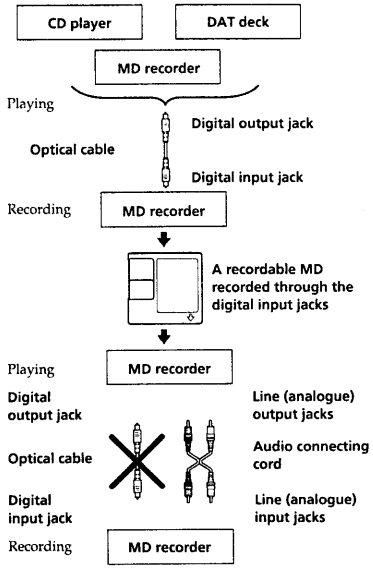
The sound has a lot of static.
➡Strong magnetism from a television or a similar device is interfering with operations. Move the recorder away from the source of strong magnetism.

Note
If the recorder does not operate properly even after you've attempted the prescribed remedies, turn off the power, then reinsert the plug into the power outlet.

Guide to the Serial Copy Management System

This MD recorder uses the Serial Copy Mangement System which allows only a first-generation digital copy to be made of prerecorded software via the MD recorder's digital input/output jacks. An outline of this system appears below:

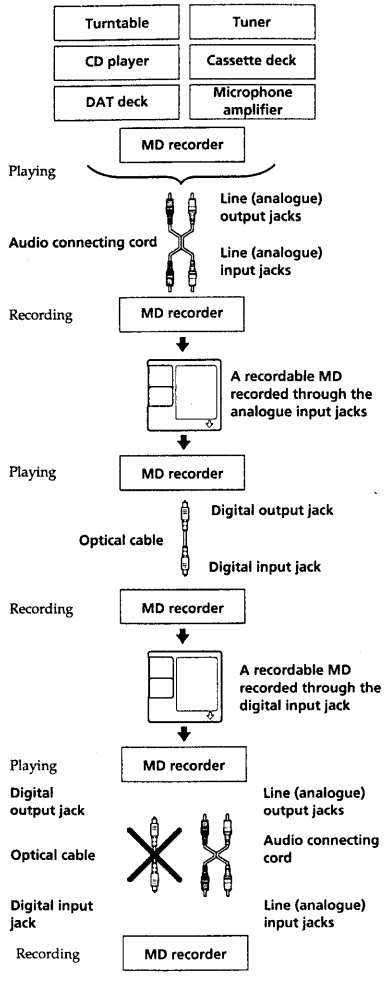
1 You can record from digital programme sources (CDs, prerecorded MDs, and DAT equipment with a sampling frequency of 44.1 kHz) onto a recordable MD via the MD recorder's digital input jack. You cannot, however, record from the recorded MD onto another recordable MD via the MD recorder's digital output jack.



Note

There are no copy generation restrictions on recording between two MD recorders connected via their respective analogue input/output jacks.

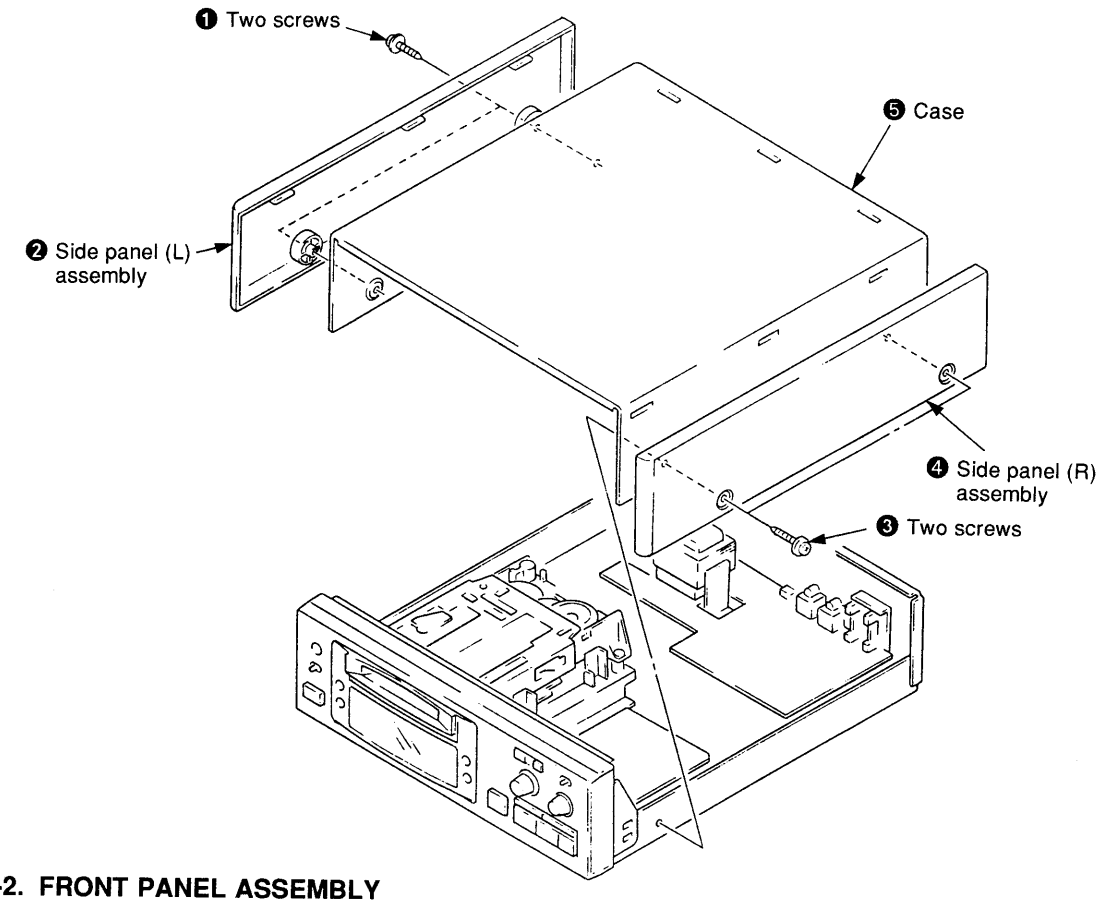
2 You can record from an MD recorded via the MD recorder's analogue input jacks to another recordable MD via the MD recorder's digital output jack.
You cannot, however, make a second-generation MD copy via tha MD recorder's digital output jack.



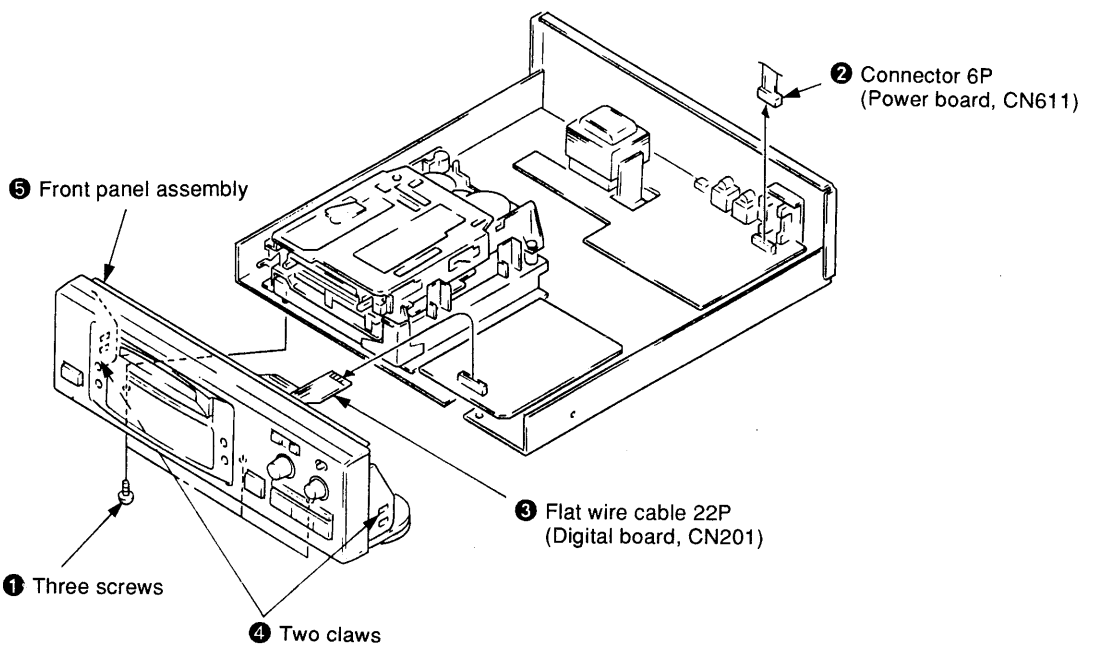
SECTION 2
DISASSEMBLY

Note : Follow the disassembly procedure in the numerical order given.

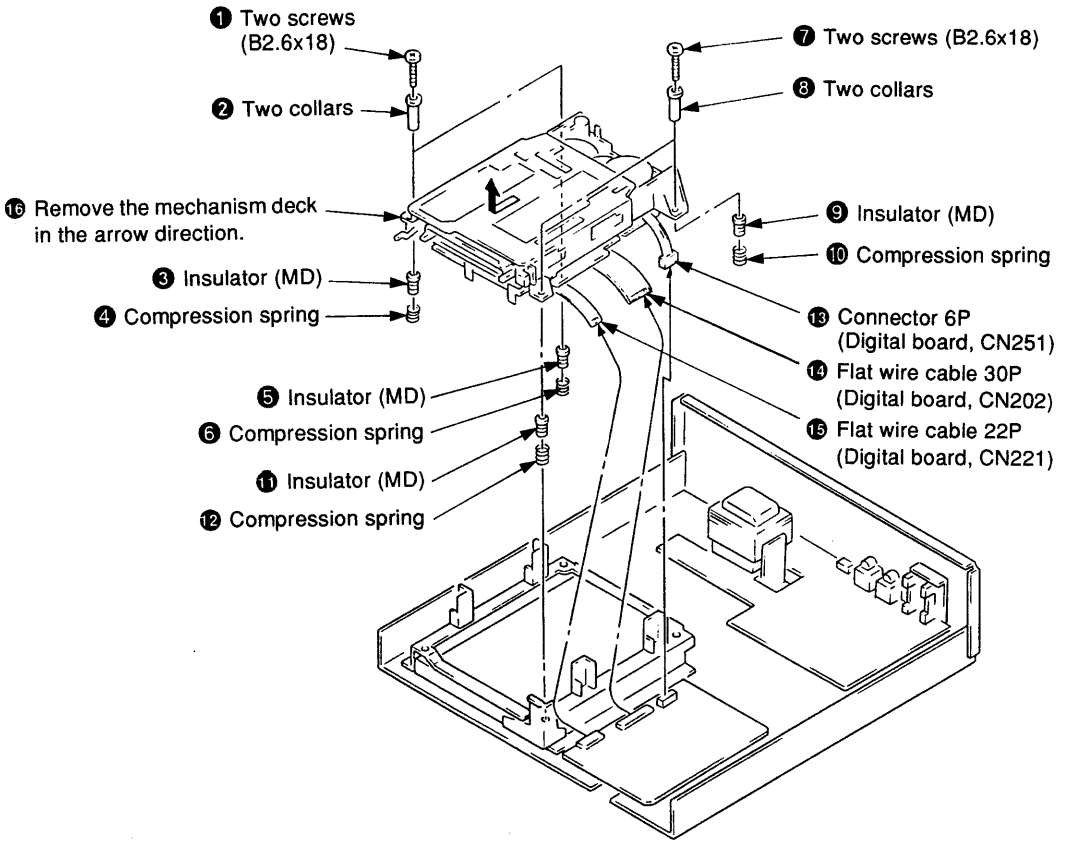
2-1. CASE



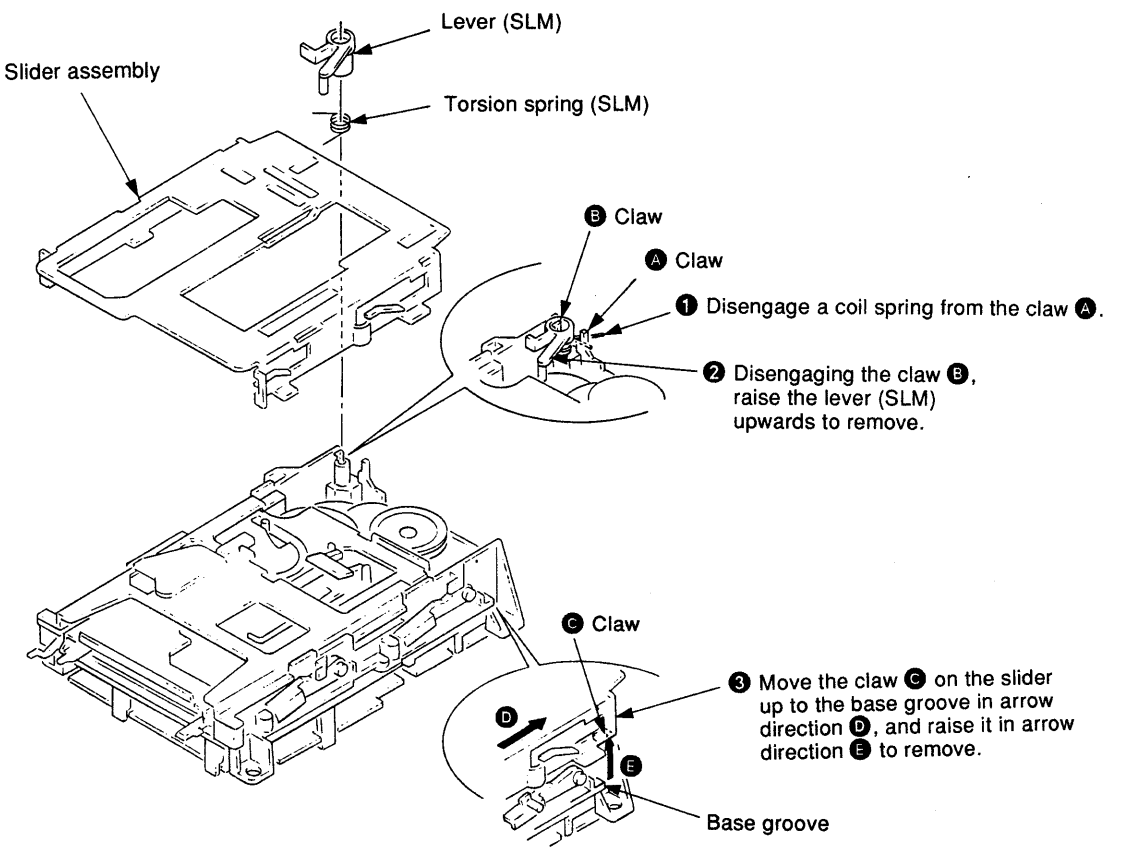
2-2. FRONT PANEL ASSEMBLY


❷ Connector 6P (Power board, CN611)
❺ Front panel assembly
❸ Flat wire cable 22P (Digital board, CN201)
❶ Three screws
❹ Two claws

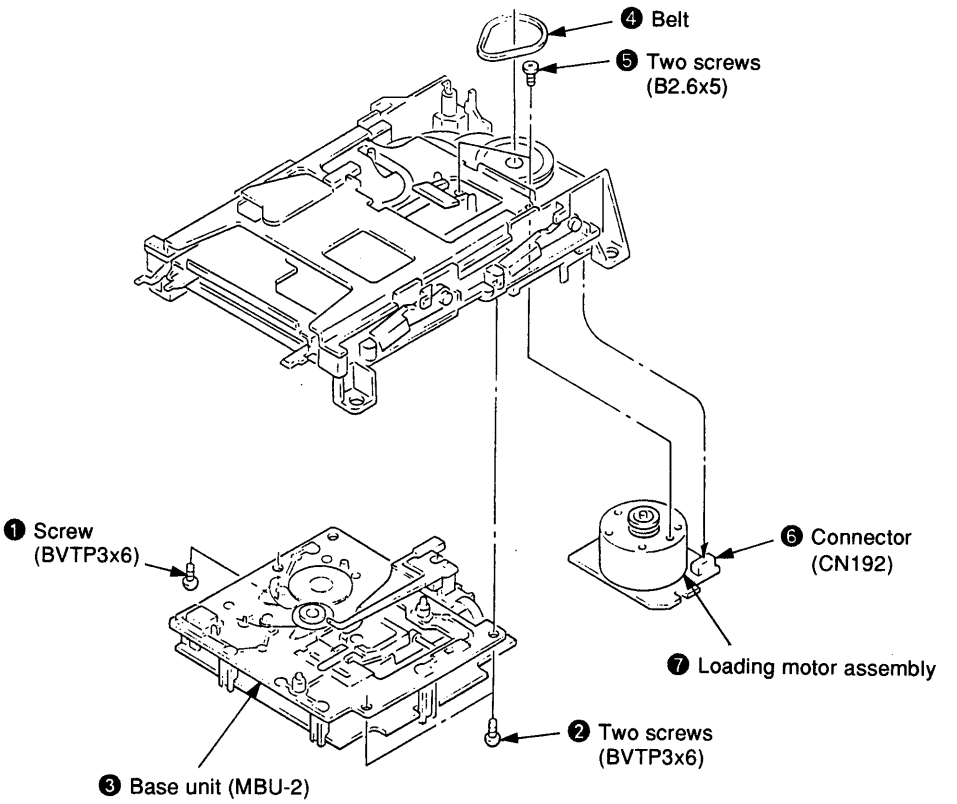
2-3. MECHANISM DECK


❶ Two screws (B2.6x18)
❷ Two collars
❸ Insulator (MD)
❹ Compression spring
❺ Insulator (MD)
❻ Compression spring
❼ Two screws (B2.6x18)
❽ Two collars
❾ Insulator (MD)
❿ Compression spring
⓫ Insulator (MD)
⓬ Compression spring
⓭ Connector 6P (Digital board, CN251)
⓮ Flat wire cable 30P (Digital board, CN202)
⓯ Flat wire cable 22P (Digital board, CN221)
⓰ Remove the mechanism deck in the arrow direction.

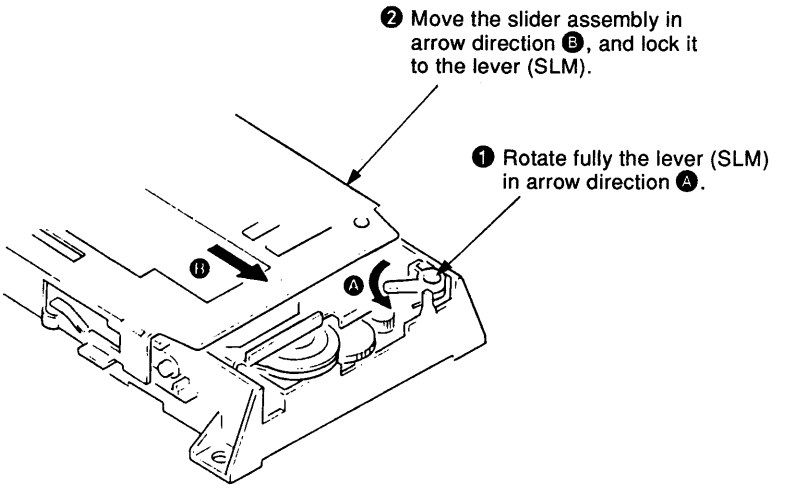
2-4. SLIDER ASSEMBLY


Lever (SLM)
Slider assembly
Torsion spring (SLM)
Ⓑ Claw
Ⓐ Claw
❶ Disengage a coil spring from the claw Ⓐ.
❷ Disengaging the claw Ⓑ, raise the lever (SLM) upwards to remove.
Ⓒ Claw
❸ Move the claw Ⓒ on the slider up to the base groove in arrow direction Ⓓ, and raise it in arrow direction Ⓔ to remove.
Base groove

2-5. BASE UNIT AND LOADING MOTOR ASSY



2-6. SLIDER ASSEMBLY MOUNTING



SECTION 3
DIAGRAMS

3-1. IC PIN FUNCTIONS

- **IC101 RF Amplifier (CXA1981R)**

Pin No.	Pin Name	I/O	Function
1	VC	O	Middle point voltage (2.5V) generation output pin
2 to 7	A to F	I	Input of signal from optical block detector
8	FI	I	F operation amplifier input
9	FO	O	F operation amplifier output
10	PD	I	Front monitor. Connected to photo diode
11	APCREF	I	Input pin for setting laser power
12	TEMPI	I	Temperature sensor connection pin
13	GND	–	Ground pin
14	AAPC	O	APC LD amplifier output pin
15	DAPC	O	Not used (Opened)
16	TEMPR	O	Temperature sensor reference voltage output pin
17	XRST	I	Input of reset signal from system controller (IC201). Reset: "L"
18	SWDT	I	Input of write data signal from system controller (IC201)
19	SCLK	I	Input of clock signal from system controller (IC201)
20	XLAT	I	Input of latch signal from system controller (IC201)
21	VREF	O	Reference voltage output. Not used in this unit (Opened)
22	TENV	O	Not used (Opened)
23	THLD	I	Not used (Connected to VC)
24	VCC	–	Power supply pin (+5V)
25	TFIL	I	Not used (Opened)
26	TE	O	Output of tracking error signal to CXD2535AR (IC121)
27	TLB	I	Input pin of add signal to tracking error
28	CSLED	I	Sled error LPF pin
29	SE	O	Output of sled error signal to CXD2535AR (IC121)
30	ADFM	O	ADIP FM signal output
31	ADIN	I	Inputs ADIP FM signal by AC coupling
32	ADAGC	I	Connection pin of external capacitor for ADIP AGC
33	ADFG	O	Output of ADIP dual FM signal to CXD2535AR (IC121) (22.05 kHz ± 1 kHz)
34	AUX	O	Output of auxiliary signal to CXD2535AR (IC121)
35	FE	O	Output of focus error signal to CXD2535AR (IC121)
36	FLB	I	Not used (Opened)
37	ABCD	O	Output of light amount signal to CXD2535AR (IC121)
38	BOTM	O	Output of bottom hold signal of light amount signal to CXD2535AR (IC121)
39	PEAK	O	Output of peak hold signal of light amount signal to CXD2535AR (IC121)
40	RFAGC	I	Connection pin of RF AGC circuit external capacitor
41	RF	O	Output of playback EFM RF signal to CXD2535AR (IC121)
42	ISET	I	Internal circuit constant setting pin. 22 kHz BPF center frequency
43	AGCT	I	Inputs RF signal by AC coupling
44	RFO	O	Output pin of RF signal
45	MORFI	I	Inputs MO RF signal by AC coupling
46	MORFO	O	Output pin of MO RF signal
47, 48	I, J	I	Input of signal from optical block detector

- **IC121 Digital signal processor, digital servo processor, EFM/ACIRC encoder/decoder (CXD2535AR)**

Pin No.	Pin Name	I/O	Function
1	FS256	O	11.2896 MHz clock output (MCLK). Not used in this unit (Opened)
2	FOK	O	Output of FOK signal to system controller (IC201) Outputs "H" when focus is set
3	DFCT	O	Outputs defect ON/OFF switching signal to CXD2535AR (IC221)
4	SHCK	O	Outputs track jump detection signal to system controller (IC201)
5	SHCKEN	I	Track jump detection enable input. Not used in this unit. (Fixed at "H" in this unit.)
6	WRPWR	I	Inputs laser power switching signal from system controller (IC201)
7	DIRC	I	Not used in this unit. (Fixed at "H" in this unit)
8	SWDT	I	Inputs write data signal from system controller (IC201)
9	SCLK	I	Inputs serial clock signal from system controller (IC201)
10	XLAT	I	Inputs serial latch signal from system controller (IC201)
11	SRDT	O	Outputs write data signal to system controller (IC201)
12	SENS	O (3)	Outputs internal status (SENSE) to system controller (IC201)
13	ADSY	O	ADIP sync signal output. Not used in this unit (Opened)
14	SQSY	O	Output subcode Q sync (SCOR) to system controller (IC201) Outputs "L" every 13.3 msec. Outputs "H" at all most mostly
15	DQSY	O	Outputs digital-in U-bit CD format subcode Q sync (SCOR) to system controller (IC201). Outputs "L" every 13.3 msec Outputs "H" at all most mostly
16	XRST	I	Inputs reset signal from system controller (IC201). Reset: "L"
17	TEST4	I	Test input (Fixed at "L")
18	CLVSCK	O	Not used in this unit (Opened)
19	TEST5	I	Test input (Fixed at "L")
20	DOUT	O	Digital audio signal output pin (For optical output)
21	DIN	I	Digital audio signal input pin (For optical input)
22	FMCK	O	ADIP FM demodulation clock signal output
23	ADER	O	ADIP CRC flag output. "H":Error
24	REC	I	Input of recording/playback switching signal from system controller (IC201) Recording: "H". Playback: "L"
25	DVSS	–	Ground pin (Digital)
26	DOVF	I	Digital audio output validity flag input pin. Fixed at "L" in this unit
27	DODT	I	Input pin of 16bit data for digital audio output from CXD2536AR (IC221)
28	DIDT	O	Output pin of 16bit data for digital audio input to CXD2536AR (IC221)
29	DTI	I	Input pin of recording audio data signal from CXD2536R (IC221)
30	DTO	O (3)	Output pin of playback audio data signal to CXD2536R (IC221)
31	C2PO	O	Outputs C2PO signal to CXD2536R (IC221). (Output indicating data error status) Playback: C2PO ("H"). Digital recording: D.In-Vflag. Analog recording: "L"
32	BCK	O	Outputs bit clock signal (2.8224 MHz) to CXD2536R (IC221) (MCLK)
33	LRCK	O	Outputs L/R clock signal (44.1 kHz) to CXD2536R (IC221) (MCLK)
34	XTAO	O	System clock (512 Fs=22.5792 MHz) signal output. Not used in this unit (Opened)
35	XTAI	I	Input of system clock (512Fs=22.5792 MHz) signal input from CXD2536R (IC221)
36	MCLK	O	MCLK clock (22.5792 MHz) signal output
37	XBCK	O	Pin 32 (BCK) inversion output
38	DVDD	–	Power supply pin (+5V) (Digital)
39	WDCK	O	WDCK clock (88.2 kHz) signal output (MCL)
40	RFCK	O	RFCK clock (7.35 kHz) signal output (MCLK)

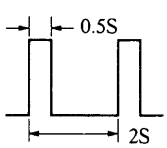
Pin No.	Pin Name	I/O	Function
41	WFCK	O	WFCK clock (7.35 kHz) signal output (Playback: EFM decoder PLL. Recording: EFM encoder PLL)
42	GTOP	O	"H": Opens playback EFM frame sync protection window
43	GFS	O	"H": Playback EFM sync and interpolation protection timing match
44	XPLCK	O	EFM decoder PLL clock output (98 Fs=4.3218 MHz) Falling edge and EFM signal edge match
45	EFMO	O	EFM signal output (Playback)
46	RAOF	O	Internal RAM overflow detection signal output (decoder monitor output) Outputs "H" when the disc rotation exceeds ± 4F jitter margin during playback
47	MVCI	I	Digital-in PLL oscillation input. Not used in this unit (Fixed at "L" in this unit)
48	TEST2	I	Test pin (Fixed at "L" in this unit)
49	DIPD	O (3)	Digital-in PLL phase comparison output Internal VCO: (Frequency: Low → "H"). External VCO: (Frequency: Low → "L")
50	DVSS	–	Ground pin (Digital)
51	DICV	I (A)	Digital-in PLL internal VCO control voltage input
52	DIFI	I (A)	Filter input when digital-in PLL internal VCO is used
53	DIFO	O (A)	Filter output when digital-in PLL internal VCO is used
54	AVDD	–	Power supply pin (+5V) (Analog)
55	ASYO	O	Playback EFM full-swing output (L=VSS, H=VDD)
56	ASYI	I (A)	Playback EFM asymmetry comparate voltage input
57	BIAS	I (A)	Playback EFM asymmetry circuit constant current input
58	RFI	I (A)	Inputs playback EFM RF signal from CXA1981R (IC101)
59	AVSS	–	Ground pin (Analog)
60	CLTV	I (A)	Decoder PLL master clock PLL VCO control voltage input
61	PCO	O (3)	Decoder PLL master clock PLL phase comparison output
62	FILI	I (A)	Decoder PLL master clock PLL filter input
63	FILO	O (3)	Decoder PLL master clock PLL filter output
64	PEAK	I (A)	Inputs peak hold signal for light amount signal from CXA1981R (IC101)
65	BOTM	I (A)	Inputs bottom hold signal for light amount signal from CXA1981R (IC101)
66	ABCD	I (A)	Light amount signal from CXA1981R (IC101)
67	FE	I (A)	Input of focus error signal from CXA1981R (IC101)
68	AUX1	I (A)	Input of auxiliary signal from CXA1981R (IC101)
69	VC	I (A)	Input of middle point voltage (+2.5V) from CXA1981R (IC101)
70	ADIO	O (A)	A/D converter input signal monitor output
71	TEST3	I (A)	Test input (Fixed at "L")
72	AVDD	–	Power supply pin (+5V) (Analog)
73	ADRT	I (A)	A/D converter operation range upper limit voltage input (Fixed at "H" in this unit.)
74	ADRB	I (A)	A/D converter operation range lower limit voltage input (Fixed at "L" in this unit.)
75	AVSS	–	Ground pin (Analog)
76	SE	I (A)	Input of sled error signal from CXA1981R (IC101)
77	TE	I (A)	Input of tracking error signal from CXD1981R (IC101)
78	AUX2	I (A)	Auxiliary input pin 2. Not used in this unit. (Fixed at "L")
79	DCHG	I (A)	Connected to GND
80	APC	I (A)	Laser APC input. Not used in this unit (Fixed at "L" in this unit)

Pin No.	Pin Name	I/O	Function
81	TEST1	I	Test pin (Fixed at "L" in this unit)
82	ADFG	I	Input of ADIP dual FM signal from CXA1981R (IC101) (22.05 kHz ± 1 kHz) (TTL Schmidt input)
83	TS25	I	Test pin (Fixed at "L" in this unit)
84	LDDR	O	Laser APC signal output
85	TRDR	O	Tracking servo drive signal output (–)
86	TFDR	O	Tracking servo drive signal output (+)
87	FFDR	O	Focus servo drive signal output (+)
88	DVDD	–	Power supply pin (+5V) (Digital)
89	FRDR	O	Focus servo drive signal output (–)
90	FS4	O	176.4 kHz clock signal output (MCLK)
91	SRDR	O	Sled servo drive signal output (–)
92	SFDR	O	Sled servo drive signal output (+)
93	SPRD	O	Spindle servo drive signal output (–)
94	SPFD	O	Spindle servo drive signal output (+)
95	DCLO	O	Not used normally (Opened in this unit)
96	DCLI	I	Not used normally (Fixed at "H" in this unit)
97	XDCL	O	Not used normally (Opened in this unit)
98	OFTRK	O	Off track signal output
99	COUT	O	Traverse count signal output
100	DVSS	–	Ground pin (Digital)

* (3) of I/O is 3-state output, (A) is analog output.

- **IC201 System Controller (M37610MD-052FP)**

Pin No.	Pin Name	I/O	Function
1	C. SET 1	I	Fixed at "L" in this unit
2	C. SET 0	I	Fixed at "L" in this unit
3	KEY 3	I	Key input pin. Not used in this unit (Fixed at "L" in this unit)
4 to 6	KEY 2 to KEY 0	I	Key input pin (A/D input) *1
7	———	I	Fixed at "L" in this unit
8	XINT	I	Input of interrupt status from CXD2536R (IC221)
9	SENS	I	Input of internal status (SENSE) from CXD2535AR (IC121)
10	SHCK	I	Input of track jump signal from CXD2535AR (IC121)
11	AUBK	I	Audio bus signal input
12	$\overline{S}$/A	O	CIRC remote control/audio bus switching signal output
13	BEEP SW	I	Fixed at "L" in this unit
14	$\overline{REC}$/OTHER	O	Recording: "L". Other times: "H" (Not used in this unit)
15	BEEP	O	Buzzer signal output (Not used in this unit)
16	F. BIAS/C2	I	Fixed at "L" in this unit
17	GND (CNVSS)	–	Ground pin
18	SYSTEM RST	I	System reset signal input. Inputs "L" for several 100 msec after power start up and then "H" thereafter.
19	XIN T	I	Not used in this unit (Fixed at "L" in this unit)
20	XOUT T	O	Not used in this unit (Fixed at "L" in this unit)
21	GND	–	Ground pin
22	XIN	I	Clock input (8 MHz)
23	XOUT	O	Clock output (8 MHz)
24	+5V	–	Power supply pin (+5V)
25	STB	O	Output of strobe signal to power supply circuit. Power ON: "H". Standby: "L"
26, 27	MIC SW	I	Fixed at "L" in this unit
28	BUS OUT	O	Audio bus signal output
29	———	I	Fixed at "L" in this unit
30, 31	LED 2, LED 1	I	Not used in this unit (Connected to GND in this unit)
32	LED 0	O	Output of drive to POWER ON/STANDBY LED (D701) Power ON: "H". Standby: "L"
33	C1	I	Fixed at "L" in this unit
34	ADER	I	Fixed at "L" in this unit
35	N.C.	I	Fixed at "L" in this unit
36	MASTER/SLAVE	I	Master/slave switching input (Fixed at "H" in this unit)
37, 38	JOG 1, JOG 0	I	Input of JOG dial pulse from rotary encoder (S701)
39	SDA	I/O	Input and output pin of data signal to/from backup memory (IC171)
40	SCL	O	Output of clock signal to backup memory (IC171)
41	POWER DOWN	I	Power down detection input. Inputs "H" normally
42	REMOCON	I	Remote control signal input
43	ATSY	I	Input of ATP address sync or subcode Q sync (SCOR) from CXD2535AR (IC121). Inputs "L" every 13.3 msec. Always "H".
44	DQSY	I	Input of digital-in U-bit CD format subcode Q sync (SCOR) from CXD2535AR (IC121). Inputs "L" every 13.3 msec. Always "H".
45 to 48	———	I	Fixed at "L" in this unit

Pin No.	Pin Name	I/O	Function
49	SCLK	O	Output of clock signal to serial bus
50	SWDT	O	Output of write data signal to serial bus
51	SRDT	I	Input of read data signal from serial bus
52	———	I	Connected to Pin 51
53	FLCLK	O	Output of serial clock signal to display driver (IC701)
54	FLDATA	O	Output of serial data signal to display driver (IC701)
55	FLCS	O	Output of chip select signal to display driver (IC701)
56	———	I	Fixed at "L" in this unit
57	TEST 0	I	Fixed at "L" in this unit
58	TEST 1	O	Output of reset signal to CXD2536R (IC221)
59, 60	———	I	Fixed at "L" in this unit
61	AFAST	I	Fixed at "L" in this unit
62	SLOW	I	Fixed at "L" in this unit
63	LDON	O	Laser ON/OFF control output. "H": Laser ON
64	P/GROOVE	I	Pit/group detection input. Inputs "H" in playback-only disc or TOC area Not used in this unit (Fixed at "L" in this unit)
65	FOK	I	Input of FOK signal from CXD2535AR (IC121) "H" is input when focus is set
66	MON	I	Not used in this unit (Pulled down at input)
67	LOCK	O	Not used in this unit (Pulled down at output)
68	WRPWR	O	Output of laser power switching signal to optical block and CXD2535AR (IC121)
69	DIG RST	O	Output of reset signal to CXA19181R (IC101), CXD2535AR (IC121), motor driver (IC151). Reset: "L"
70	DA RST	O	Output of reset signal to D/A converter (IC281) and A/D converter (IC261). Reset: "L"
71, 72	SCMD 1, SCMD 0	O	Output of serial command control mode to CXD2536R (IC221)
73	MOD	O	Laser modulation switching signal output Playback power: "L". Stop: "H" Recording power: 
74	REC/PB	O	Output of recording/playback switching signal to CXD2535AR (IC121) Recording: "H". Playback: "L"
75	WR/MN	O	Output of write/monitor mode switching signal to CXD2536R (IC221)
76	SCTX	O	Output of write data transmission timing to CXD2536R (IC221) Also used as magnetic field head ON/OFF output
77	XLATCH	O	Output of latch signal to serial bus
78	DFLATCH	O	Output of latch signal to D/A converter (IC281)
79	DFMUTE	O	Muting output. Not used in thins unit (Connected to GND in this unit)
80	AMUTE	O	Line out muting output
81	LDOUT	O	Loading motor (M191) control output *2
82	LDIN	O	Loading motor (M191) control output *2
83	CHKIN	I	Output of detection signal from chucking-in switch (S193) Chucking: "L"

Pin No.	Pin Name	I/O	Function
84	INSW	I	Output of detection signal from loading-in switch (S191) "L" at position where magnetic field head descends. "H" at other times.
85	OUTSW	I	Input of detection signal from loading-out switch (S192) "L" at load-out position. "H" at other times
86	PROTECT	I	Input of record-protect tab detection signal from protect detection switch (S102-1) Protect: "H"
87	REFLECT	I	Disc reflectance ratio detection signal input from reflect detection switch (S102-2) Low reflectance ratio disc: "H"
88	LIMIT IN	I	Input of detection signal from limit-in switch (S101) Sled limit-in:"L"
89	232C. 4	I	RS232C expansion input pin. Not used in this unit (Fixed at "L" in this unit)
90	232C. 3	I	RS232C expansion input pin. Not used in this unit (Fixed at "L" in this unit)
91	232C. 2	I	RS232C expansion input pin. Not used in this unit (Fixed at "L" in this unit)
92	232C. 1	I	RS232C expansion input pin. Not used in this unit (Fixed at "L" in this unit)
93 to 96	———	I	Fixed at "L" in this unit
97	AVSS (AGND)	–	Ground pin
98	VREF (+5V)	I	Reference voltage input (+5V)
99	TIMER REC/PLAY	I	Timer recording/playback /OFF switching input Timer recording: "H". Timer playback: "L". Timer OFF: Middle point voltage (2.5V)
100	INPUT SELECT	I	Input signal (Analog/digital input) selection signal input Analog input: "L". Digital; input: "H"

*1 Key Inputs

Pin \ Voltage	0V	0.9V	1.75V	2.5V	3.4V	4.2V	5V
KEY 0 6 pin	S771 ●	S772 ■	S773 ▷II	S774 ▶▶	S775 ◀◀	S776 ⏏	No key input
KEY 1 5 pin	S761 PLAY MODE	S762 REPEAT	S763 CLOCK SET	S764 POWER			No key input
KEY 2 4 pin	S751 EDIT NO	S752 YES				S756 DISPLAY	No key input

*2 Loading motor control

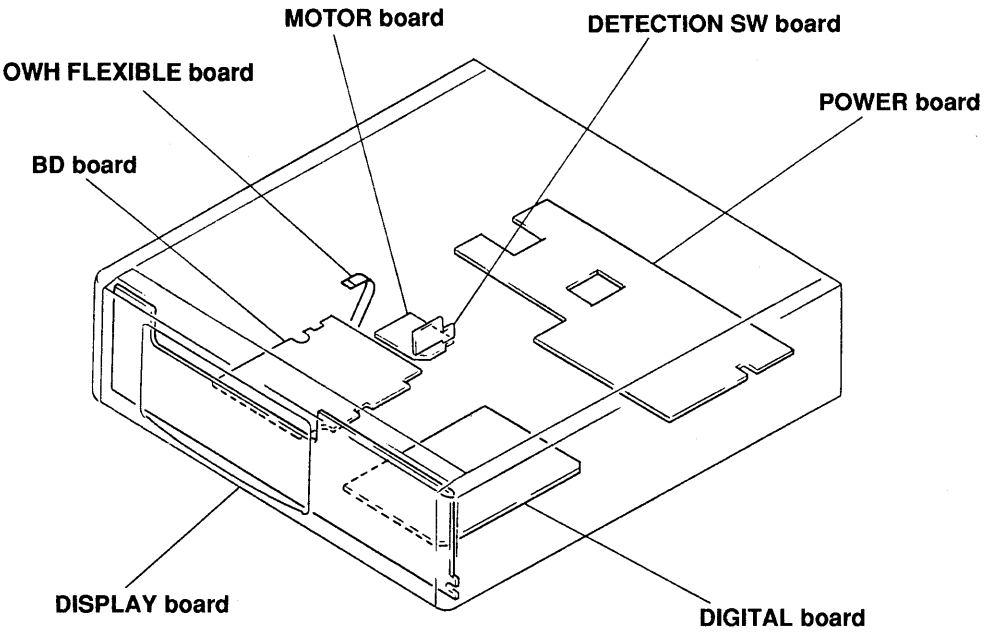
Pin \ Operation	IN	OUT	BRAKE
LDIN 82 pin	"H"	"L"	"H"
LDOUT 81 pin	"L"	"H"	"H"

- **IC221 Shock-Proof Memory Controller, ATRAC Encoder/Decoder (CXD2536R)**

Pin No.	Pin Name	I/O	Function
1	VDD	--	Power supply pin (+5V)
2	SWDT	I	Input of write data signal from system controller (IC201)
3	SCK	I	Input of serial clock signal from system controller (IC201)
4	XLAT	I	Input of serial latch signal from system controller (IC201)
5	SRDT	O/Z	Output of read data signal to system controller (IC201)
6	SENSE	O/Z	Output of internal status (SENSE) to system controller (IC201)
7	SCMD0	I	Input of serial command control mode from system controller (IC201)
8	SCMD1	I	Input of serial command control mode from system controller (IC201)
9	XINT	O	Output of interrupt status to system controller (IC201)
10	RCPB	I	Recording/playback switching input. Not used in this unit (Fixed at "L" in this unit)
11	WRMN	I	Input of write/monitor mode switching signal from system controller (IC201)
12	TX	I	Input of write data transmission timing from system controller (IC201) Also used as magnetic field head ON/OFF output
13	VSS	–	Ground pin
14	SICK	I	Chip reservation pin (Fixed at "L" in this unit)
15	IDSL	I	Chip reservation pin (Fixed at "L" in this unit)
16	XILT	I	Chip reservation pin (Fixed at "H" in this unit)
17	XRST	I	Input of reset signal from system controller (IC201). Reset: "L"
18 to 21	TS0 to TS3	I	Test pin (Fixed at "L" in this unit)
22	EXIR	I	Chip reservation pin (Fixed at "H" in this unit)
23	SASL	I	Block selection in single use. "L": ATRAC. "H": RAM controller (Fixed at "L" in this unit)
24	SNGLE	I	Normally fixed at "L. Fixed at "H" when used as ATRAC or RAM controller for single. Fixed at "L" in this unit.
25	VSS	–	Ground pin
26	AIRCPB	O	Output pin of ATRAC and external audio block recording/playback mode signal
27	XRQ	I/O	ATRAC I/F XRQ signal input/output pin
28	ADTO	I/O	ATRAC decode data signal input/output pin
29	ADTI	I/O	ATRAC encode data signal input/output
30	XALT	I/O	ATRAC I/F XALT signal input/output pin
31	ACK	I/O	ATRAC I/F ACK signal input/output pin
32	AC2	I/O	ATRAC I/F error data signal input/output pin
33	LCHST	I/O	ATRAC I/F Lch start data signal input/output pin
34	EXE	I/O	ATRAC I/F EXE signal input/output pin
35	MUTE	I/O	ATRAC I/F MUTE signal input/output pin
36	OSCO	O	Clock output (45 MHz)
37	OSCI	I	Clock input (45 MHz)
38	VSS	–	Ground pin
39	ATT	I/O	ATRAC I/F ATT signal input/output pin
40	F86	O	ATRAC block 11.6 msec timing signal output pin
41	DOUT	O	Output of monitor/decode audio data signal to D/A converter (IC281)
42	ADIN	I	Input of recording signal from A/D converter (IC261)
43	ABCK	O	Output of bit clock signal to A/D and D/A converters (IC261, IC281)
44	ALRCK	O	Output of L/R clock to A/D and D/A converters (IC261, IC281)
45 to 47	SA2 to SA0	O	Address signal output. Not used in this unit (Opened)

Pin No.	Pin Name	I/O	Function
48, 49	A11, A10	O	Address signal output. Not used in this unit (Opened)
50	VSS	–	Ground pin
51	VDD	–	Power supply pin (+5V)
52 to 55	A03 to A00	O	Output of address signal to RAM (IC222)
56 to 60	A04 to A08	O	Output of address signal to RAM (IC222)
61	XOE	O	Output of output enable control signal to RAM (IC222)
62	XCAS	O	Output of column address strobe signal to RAM (IC222)
63	VSS	–	Ground pin
64	XCS	O	Output of chip select signal to RAM (IC222)
65	A09	O	Output of address signal to RAM (IC222)
66	XRAS	O	Output of row address strobe signal to RAM (IC222)
67	XWE	O	Output of read/write control signal to RAM (IC222)
68, 69	D1, D0	I/O	Input/output pin of data signal to/from RAM (IC222)
70, 71	D2, D3	I/O	Input/output pin of data signal to/from RAM (IC222)
72 to 74	D4 to D6	I/O	Data signal input/output pin. Not used in this unit (Opened)
75	VSS	–	Ground pin
76	D7	I/O	Data signal input/output pin. Not used in this unit (Opened)
77	ERR	I/O	Input/output pin of error (C2PO) data to external RAM. Not used in this unit (Opened)
78	EXTC2R	I	External RAM selection input for error data writing ("H": External RAM). Fixed at "L" in this unit
79	BUSY	O	RAM access BUSY signal output. Not used in this unit (Opened)
80	EMP	O	EMPTY or immediately before FULL of ATRAC data (When DSC=ASC+1: "H")
81	FUL	O	FULL or immediately before EMPTY of ATRAC data (When ASC=DSC+1: "H")
82	EQL	O	ATRAC data EMPTY (When DSC=ASC: "H")
83	MDLK	O	Indicates recording/playback data main/sub ("H": Sub, Linking: "L": Main)
84	CPSY	O	Interpolation sync signal output
85	CTMD0	O	DSC counter mode output
86	CTMD1	O	DSC counter mode output
87	SPO	O	Output of system clock (512Fs=22.5792 MHz) signal to CXD2535AR (IC221)
88	VSS	–	Ground pin
89	MDSY	O	Main data sync detection signal output
90	LRCK	I	Input of L/R clock signal from CXD2535AR (IC221) (44.1 kHz)
91	BCK	I	Input of bit clock signal from CXD2535AR (IC221) (2.8224 MHz)
92	C2PO	I	Input of C2PO signal from CXD2535AR (IC221) (Shows data error status) Playback:C2PO ("H"). Digital recording: D.In-Vflag. Analog recording: "L"
93	DATA	I/O	Recording:Output of recording audio data signal to CXD2535AR (IC221) PLayback:Input of playback audio data signal from CXD2535AR (IC221)
94	DIDT	I	Input of digital audio input 16-bit data from CXD2535AR (IC221)
95	DODT	O	Output of digital audio output 16-bit data to CXD2535AR (IC221)
96	DIRCPB	O	Disc drive and EFM encoder/decoder recording/playback mode output Not used in this unit (Opened)
97	MIN	I	Input of defect ON/OFF switching signal from CXD2535AR (IC121)
98	SPOSL	I	Pin 87 (SPO) input/output switching input pin ("L":IN. "H":OUT). Fixed at "H" in this unit
99	MCKT1	O	RAM controller internal master clock output pin
100	VSS	–	Ground pin

3-2. CIRCUIT BOARDS LOCATION



3-3. PRINTED WIRING BOARD — RF SECTION —

• See page 52 for Semiconductor Lead Layouts.

• **Waveforms**

1 — IC101 (47),(48) (I, J) — APPROX. 0.35Vp-p (PLAY mode)

2 — IC101 (2) (A) — APPROX. 0.18Vp-p (PLAY mode)

3 — IC101 (6),(7) (E, F) — APPROX. 0.08Vp-p (PLAY mode)

4 — IC121 (90) (FS4), IC151 (3) (CLK) — 5.2Vp-p, 5.8μsec

5 — IC121 (22) (FMCK) — 5.2Vp-p, 0.16msec

6 — IC121 (44) (XPLCK) — 5.2Vp-p, 0.23μsec

7 — IC121 (41) WFCK — 5.2Vp-p, 135μsec

8 — IC121 (39) (WDCK) — 5.2Vp-p, 11μsec

9 — IC121 (37) (XBCK) — 5.2Vp-p, 0.36μsec

10 — IC121 (36) (MCLK) — 3.4Vp-p, 46nsec

11 — IC121 (35) (XTAI) — 4Vp-p, 46nsec

12 — IC121 (34) (XTAO) — 3.1Vp-p, 46nsec

13 — IC121 (33) (LRCK) — 5.2Vp-p, 23μsec

14 — IC121 (32) (BCK) — 5.2Vp-p, 0.36μsec

• **Semiconductor Location**

Ref. No.	Location
D101	C-6
D155	F-11
D161	B-8
D181	C-2
D183	C-2
IC101	D-10
IC102	D-11
IC121	F-9
IC122	D-9
IC151	G-12
IC171	D-8
IC172	C-10
IC181	C-12
IC182	C-11
IC191	G-5
Q101	B-9
Q151	F-12
Q162	B-10
Q163	B-8
Q164	B-8
Q181	C-1
Q182	C-1

Note:

- ○—— : parts extracted from the component side.
- —— : parts extracted from the conductor side.
- ⊗ : Through hole.
- ▒▒ : Pattern from the side which enable seeing. (The other layer's patterns are not indicated.)

【OWH FLEXIBLE BOARD】

HR901 OVER WRITE HEAD

1-654-446-11

OPTICAL PICK-UP BLOCK (KMS-210A/J-N)

【BD BOARD】(COMPONENT SIDE)

【BD BOARD】(CONDUCTOR SIDE)

M102 SPINDLE MOTOR

M101 SLED MOTOR

S102-1 PROTECT SWITCH

S102-2 RFLCT SWITCH

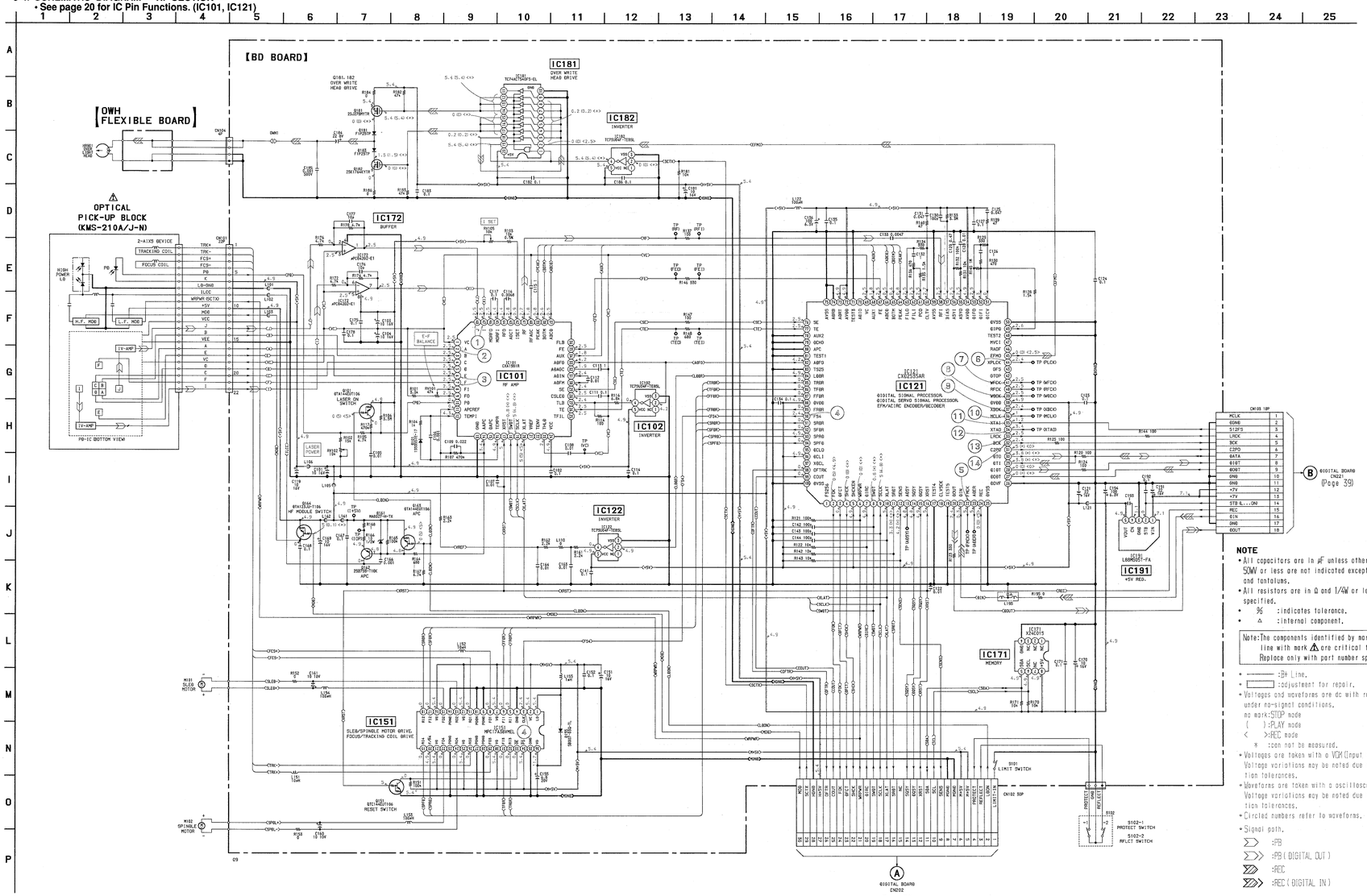
1-653-413-13 (13)

09

A DIGITAL BOARD CN102 → CN202 CN103 → CN221 (Page 43)

3-4. SCHEMATIC DIAGRAM — RF SECTION —

• See page 20 for IC Pin Functions. (IC101, IC121)



NOTE

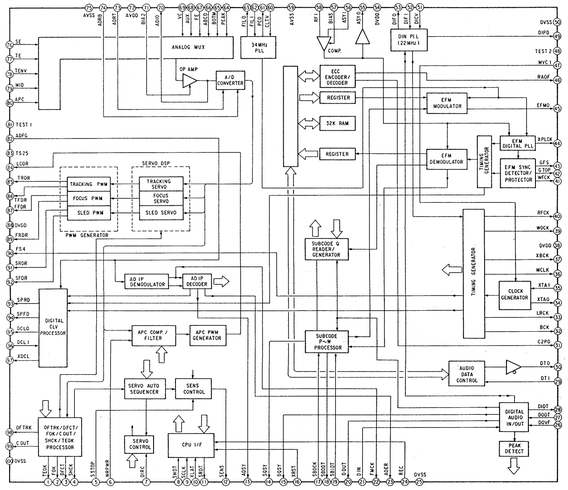
- All capacitors are in μF unless otherwise noted. pF: μμF
  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- % : indicates tolerance.
- Δ : internal component.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

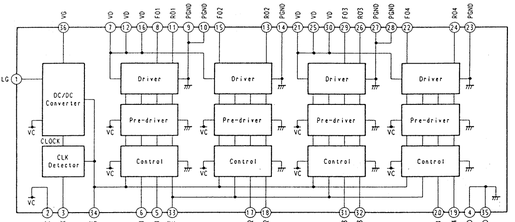
- ——— : B+ Line.
- ▭ : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark: STOP mode
  ( ): PLAY mode
  < >: REC mode
  * : can not be measured.
- Voltages are taken with a VOM (Input impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ▷ : PB
  ▷▷ : PB (DIGITAL OUT)
  ▨ : REC
  ▨▨ : REC (DIGITAL IN)

• IC Block Diagrams

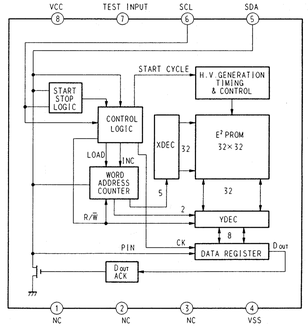
IC121 CXD2535AR



IC151 MPC17A38VMEL

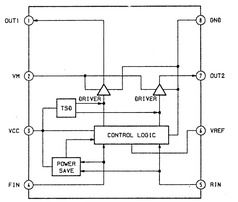


IC171 X24C01S

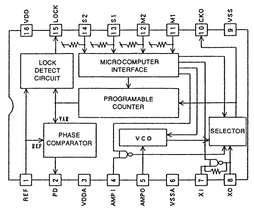


• IC Block Diagrams

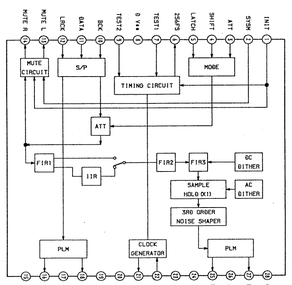
IC241 BA6287F



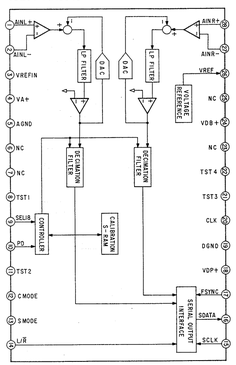
IC251 TC9246F-TP1



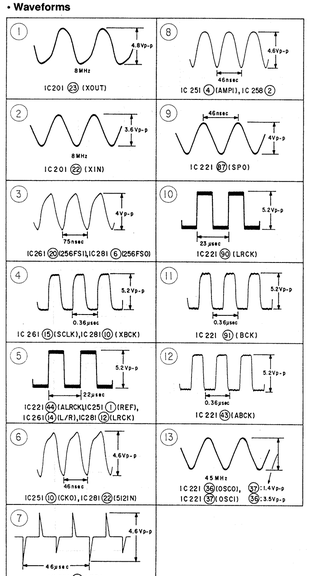
IC281 CXD2564AM



IC261 AK5340



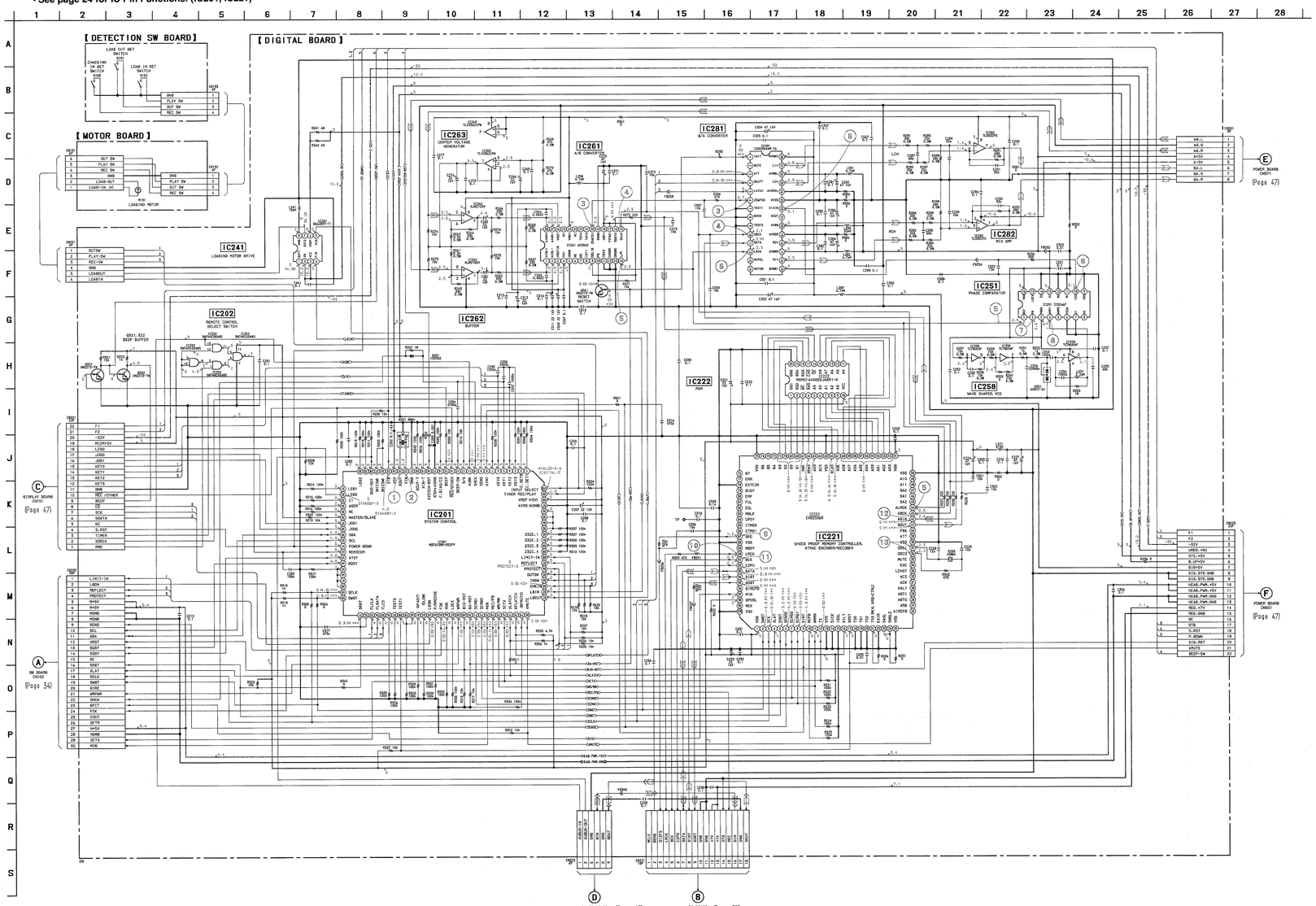
• Waveforms


① 4.8Vp-p 8MHz IC201 ㉓ (XOUT)
② 3.6Vp-p 8MHz IC201 ㉒ (XIN)
③ 4Vp-p 75nsec IC261 ⑳256FSI),IC281 ⑧256FSO)
④ 5.2Vp-p 0.36μsec IC261 ⑯(SCLK),IC281 ⑩(XBCK)
⑤ 5.2Vp-p 22μsec IC221 ㊹(ALRCK),IC251 ①(REF), IC261 ⑭(L/R),IC281 ⑫(LRCK)
⑥ 4.6Vp-p 46nsec IC251 ⑩(CKO),IC281 ㉒(512IN)
⑦ 4.6Vp-p 46μsec IC 251 ②(PD)
⑧ 4.6Vp-p 46nsec IC 251 ④(AMPI), IC 256 ②
⑨ 46nsec 4Vp-p IC 221 ㊼(SPO)
⑩ 5.2Vp-p 23μsec IC 221 ㊷(LRCK)
⑪ 5.2Vp-p 0.36μsec IC 221 ㊸(BCK)
⑫ 5.2Vp-p 0.36μsec IC 221 ㊸(ABCK)
⑬ 45 MHz IC 221 ㊱(OSCO), IC 221 ㊲(OSCI) ㊲:1.4Vp-p ㊱:3.5Vp-p

— 37 —

3-5. SCHEMATIC DIAGRAM — DIGITAL SECTION —

• See page 24 for IC Pin Functions. (IC201, IC221)



NOTE

- All capacitors are in μF unless otherwise noted. pF: μF 50WV or less are not indicated except for electrolytics and tantaliums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- % : indicates tolerance.
- Δ : internal component.
- ———— : 5V Line.
- — — — : 3V Line.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark: STOP mode
  ( ) : PLAY mode
  < > : REC mode
  (( )) : LOADING OPERATION
  * : can not be measured.
- Voltages are taken with a VOM (input impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  - >> : PB
  - >>> : PB (DIGITAL OUT)
  - >> : REC
  - >>> : REC (DIGITAL IN)

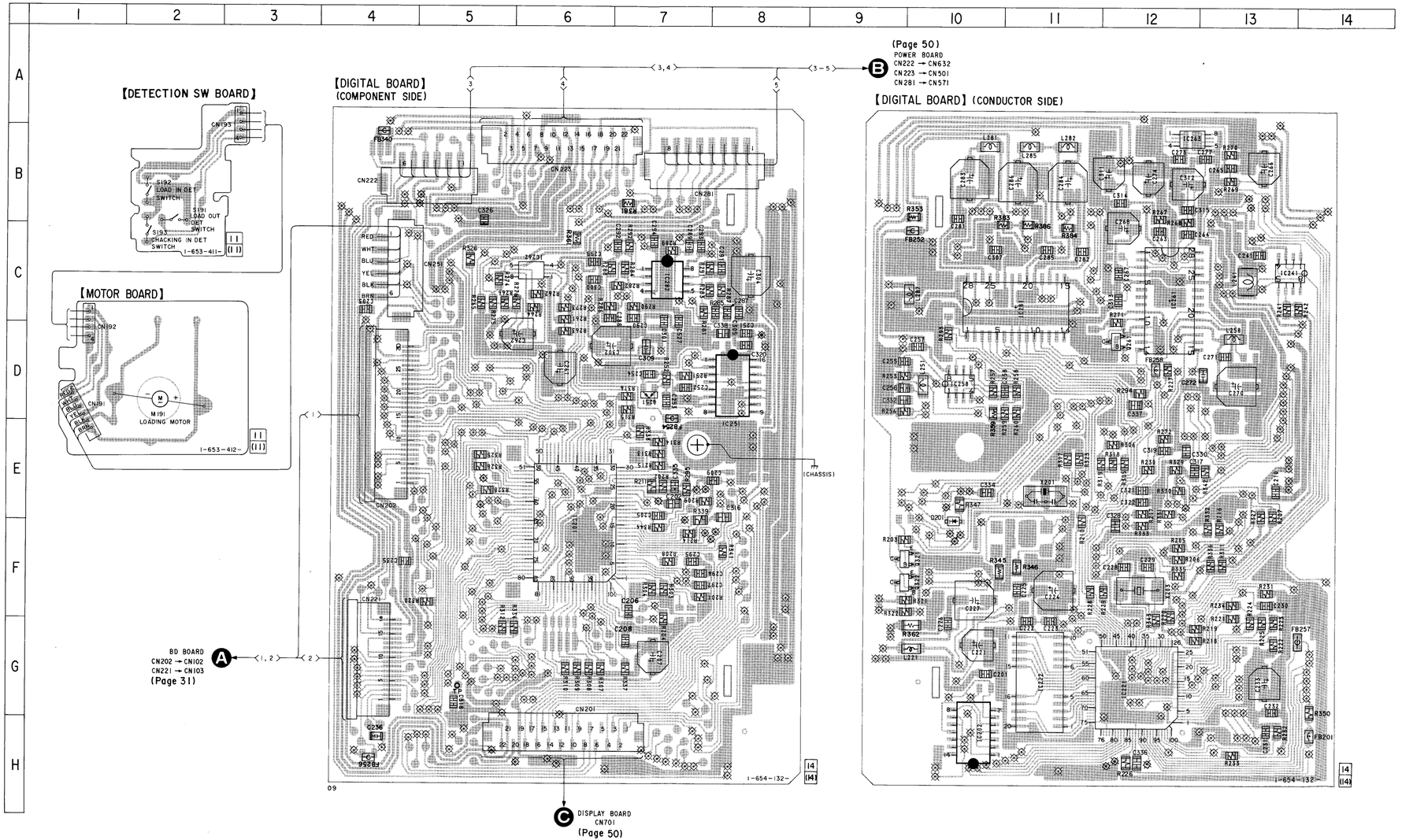
— 38 —

— 39 —

— 40 —

3-6. PRINTED WIRING BOARD — DIGITAL SECTION —

• See page 29 for Circuit Boards Location.
• See page 52 for Semiconductor Lead Layouts.


【DETECTION SW BOARD】
【MOTOR BOARD】
M191 LOADING MOTOR
【DIGITAL BOARD】 (COMPONENT SIDE)
【DIGITAL BOARD】 (CONDUCTOR SIDE)
(Page 50) POWER BOARD CN222 → CN632 CN223 → CN501 CN281 → CN571
BD BOARD CN202 → CN102 CN221 → CN103 (Page 31)
DISPLAY BOARD CN701 (Page 50)
(CHASSIS)

• **Semiconductor Location**

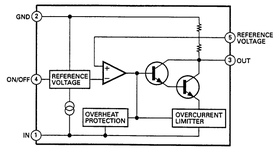
Ref. No.	Location
D251	D-7
IC201	E-6
IC202	H-10
IC221	G-12
IC222	G-11
IC241	C-13
IC251	D-8
IC258	D-10
IC261	C-12
IC262	C-6
IC263	B-12
IC281	C-11
IC282	C-7
Q261	D-12
Q321	F-10
Q322	F-10

Note:

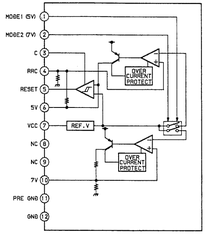
- ○—— : parts extracted from the component side.
- —— : parts extracted from the conductor side.
- ◈ : Through hole.
- ▒▒ : Pattern from the side which enable seeing. (The other layer's patterns are not indicated.)

• IC Block Diagrams

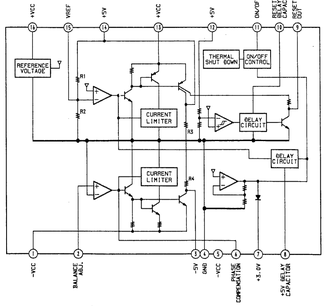
IC501 M5293L



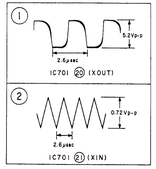
IC511 BA3963



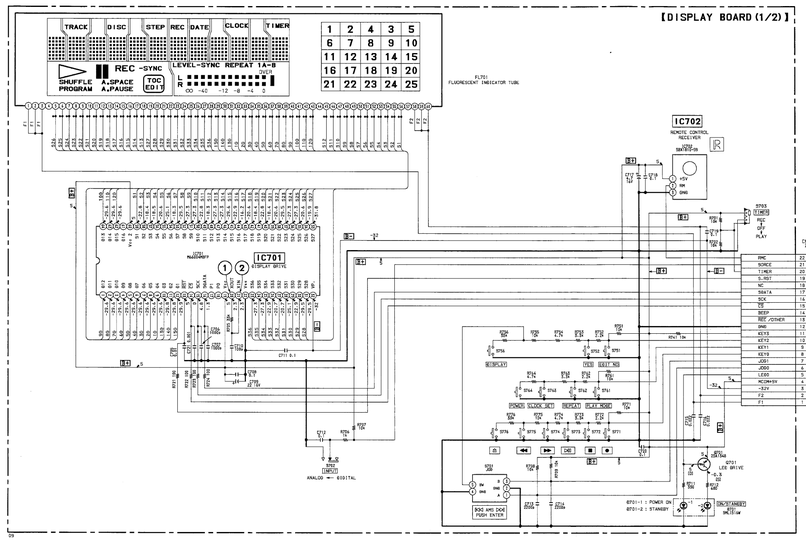
IC561 M5294P

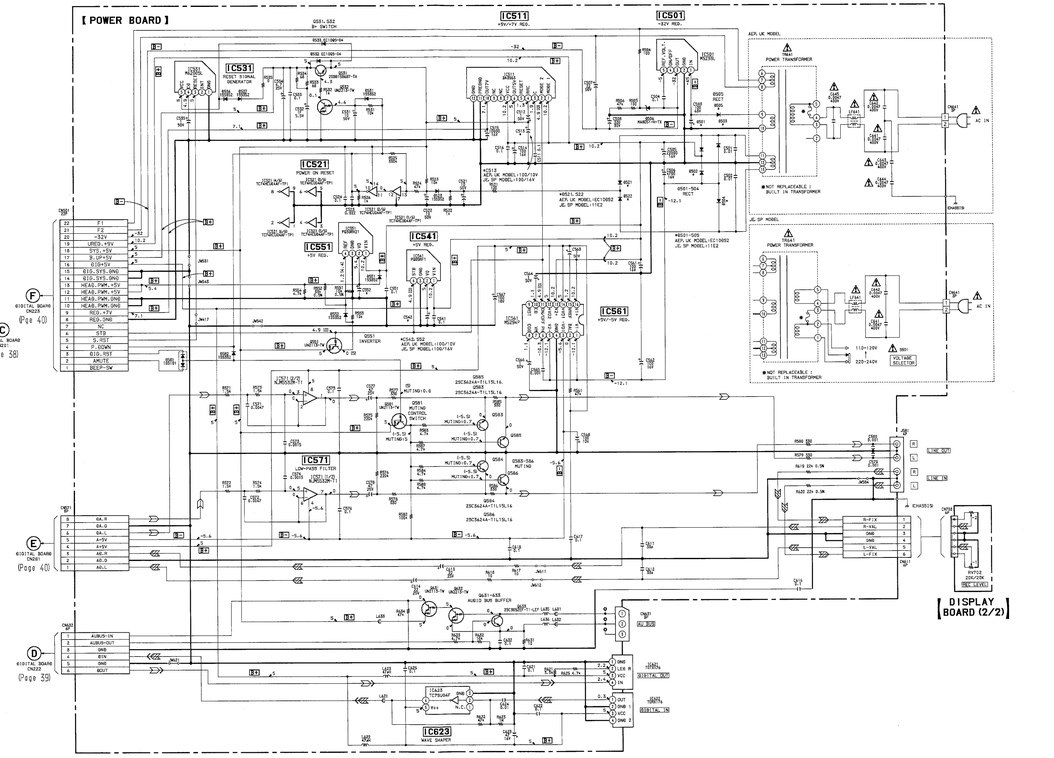


• Waveforms



3-7. SCHEMATIC DIAGRAM — DISPLAY/POWER SECTION —





NOTE

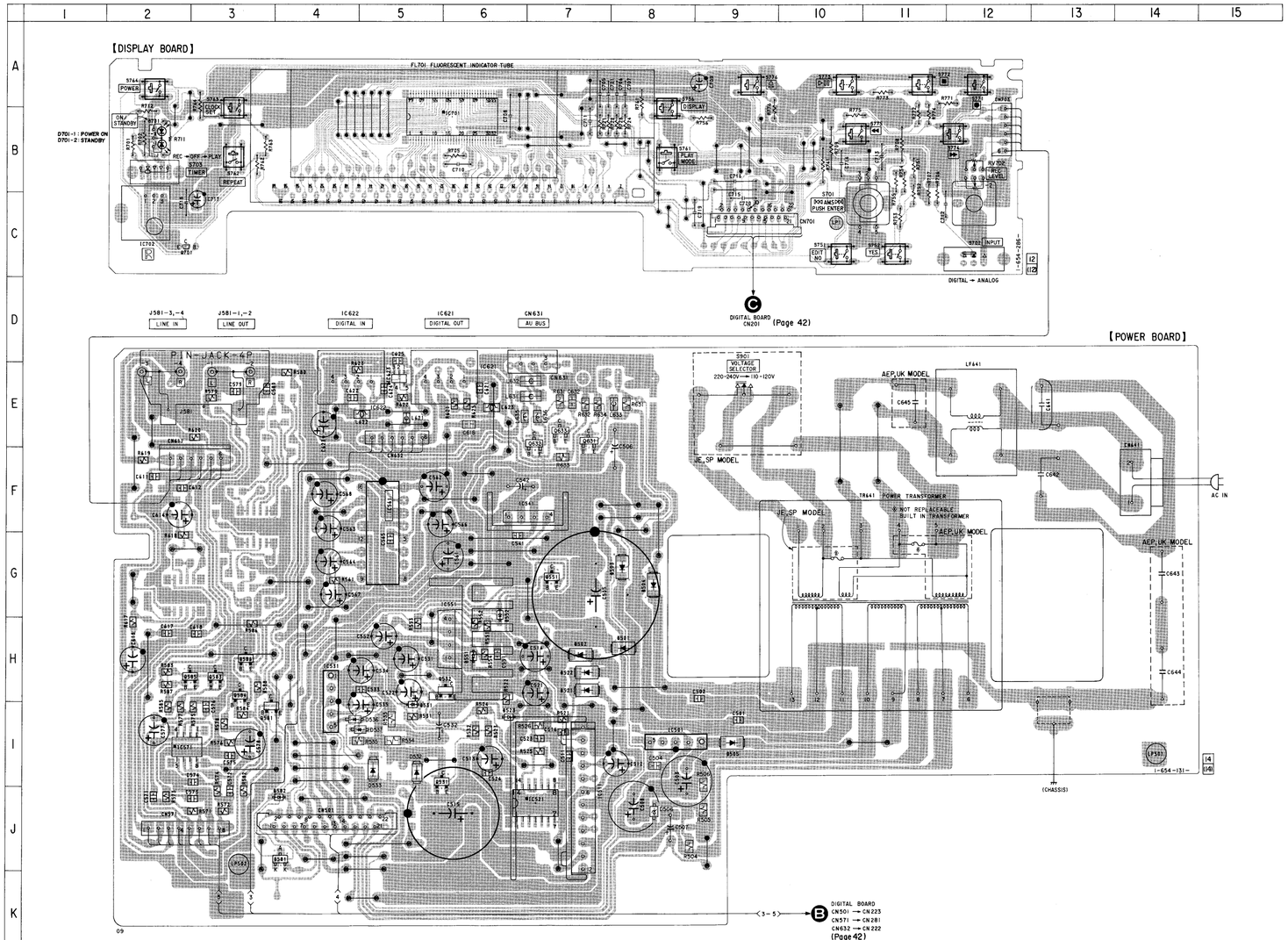
- All capacitors are in μF unless otherwise noted. pF: μμF. 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- % : indicates tolerance.
- ▭ : panel designation.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- B+ : B+ Line.
- B- : B- Line.
- Voltages and waveforms are dc with respect to ground under no-signal conditions. no mark: STOP mode ( ): PLAY mode < > : STAND-BY mode
- Voltages are taken with a VOM (input impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Abbreviation
  - SP : Singapore model.
  - JE : Tourist model.
- Signal path.
  - : PB
  - : PB (DIGITAL OUT)
  - : REC
  - : REC (DIGITAL IN)

3-8. PRINTED WIRING BOARD — DISPLAY/POWER SECTION —

- See page 29 for Circuit Boards Location.
- See page 52 for Semiconductor Lead Layouts.



• Semiconductor Location

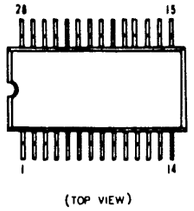
Ref. No.	Location
D501	H-8
D502	H-7
D503	G-8
D504	G-8
D505	I-9
D506	J-8
D521	H-7
D522	H-7
D523	I-6
D531	I-5
D532	I-5
D533	I-5
D536	I-5
D537	I-5
D551	H-6
D552	H-6
D581	J-4
D582	J-4
D701	C-2
IC501	I-8
IC511	J-7
IC521	J-7
IC531	H-4
IC541	F-6
IC551	H-6
IC561	F-5
IC571	I-2
IC621	E-5
IC622	E-4
IC623	E-5
IC701	B-7
IC702	B-2
Q531	I-6
Q532	H-6
Q551	G-7
Q581	I-3
Q583	H-3
Q584	H-3
Q585	H-2
Q586	H-3
Q631	E-7
Q632	E-7
Q633	E-7
Q701	B-4

Note:

- ○—— : parts extracted from the component side.
- ■ : parts mounted on the conductor side.
- ▒▒▒ : Pattern from the side which enable seeing.
- Abbreviation
  SP : Singapore model.
  JE : Tourist model.

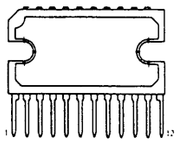
3-9. SEMICONDUCTOR LEAD LAYOUTS

AK5340-VS
CXD2564AM

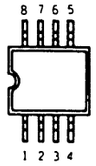


(TOP VIEW)

BA3963

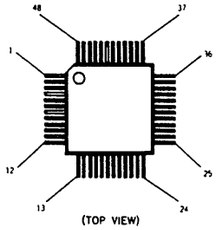


BA6287F
NJM2100V
NJM5532M
TC7WU04F
TL082CPS
TLV2362IPW-ELM1500)
µPC842G2
X24C01S



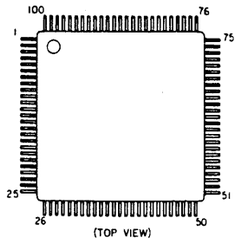
(TOP VIEW)

CXA1981R



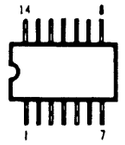
(TOP VIEW)

CXD2535AR
CXD2536R



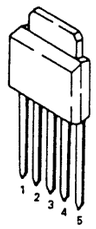
(TOP VIEW)

HD74HC00FPEL
SN74HC00FPEL
SN74HCU04ANS
TC74HCU04AF

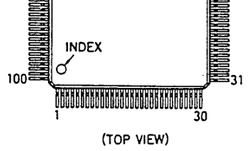


(TOP VIEW)

L88MS05T-FA

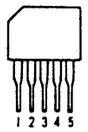


M37610MD-052FP

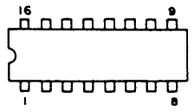


(TOP VIEW)

M5293L
M62005L



M5294P



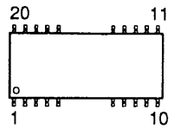
(TOP VIEW)

M66004M8FP

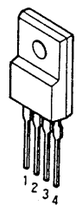
(TOP VIEW)

MPC17A38VMEL

MSM514400BSJADR1-K

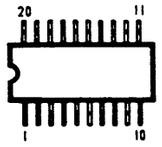


PQ05RF1
PQ30RV21



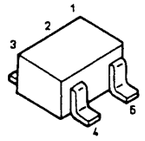
1 : V IN 3 : GND
2 : V OUT 4 : ON/OFF CONTROL

TC74ACT540FS

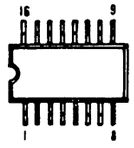


(TOP VIEW)

TC7SU04F

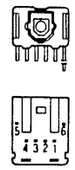


TC9246F-TP1



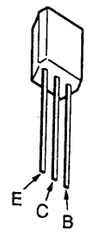
(TOP VIEW)

TORX176
TOTX176

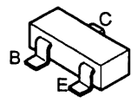


TORX176:	TOTX176:
1. OUT PUT	1. GND
2. GND1	2. LED - R
3. Vcc	3. Vcc
4. GND2	4. IN
5. CASE	5. NC
6. CASE	6. NC

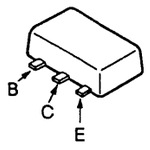
DTA144ES
DTC144ES



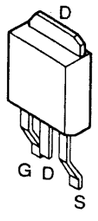
DTA123JU
DTA144EK
DTA144EU
DTC144EU
RN2305
UN2213
UN5113
UN5213
2SA1676
2SB1295-UL6
2SC1623-L5L6
2SC3624A-L15
2SC4396



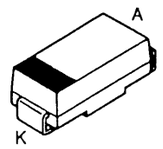
2SB798-DL



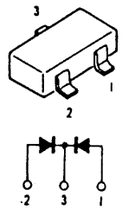
2SJ278MY
2SK1764KY



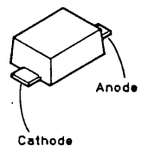
EC10DS2
EC10QS-04
F1P2STP



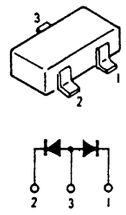
HVM17-01



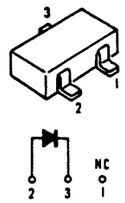
MA8027-L
MA8051-H



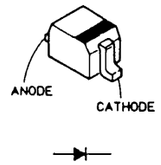
1SS181



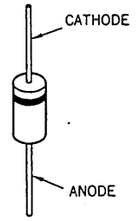
1SS322-TE85L



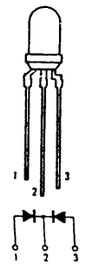
1SS352
1SS355



10E2



SEL1516W

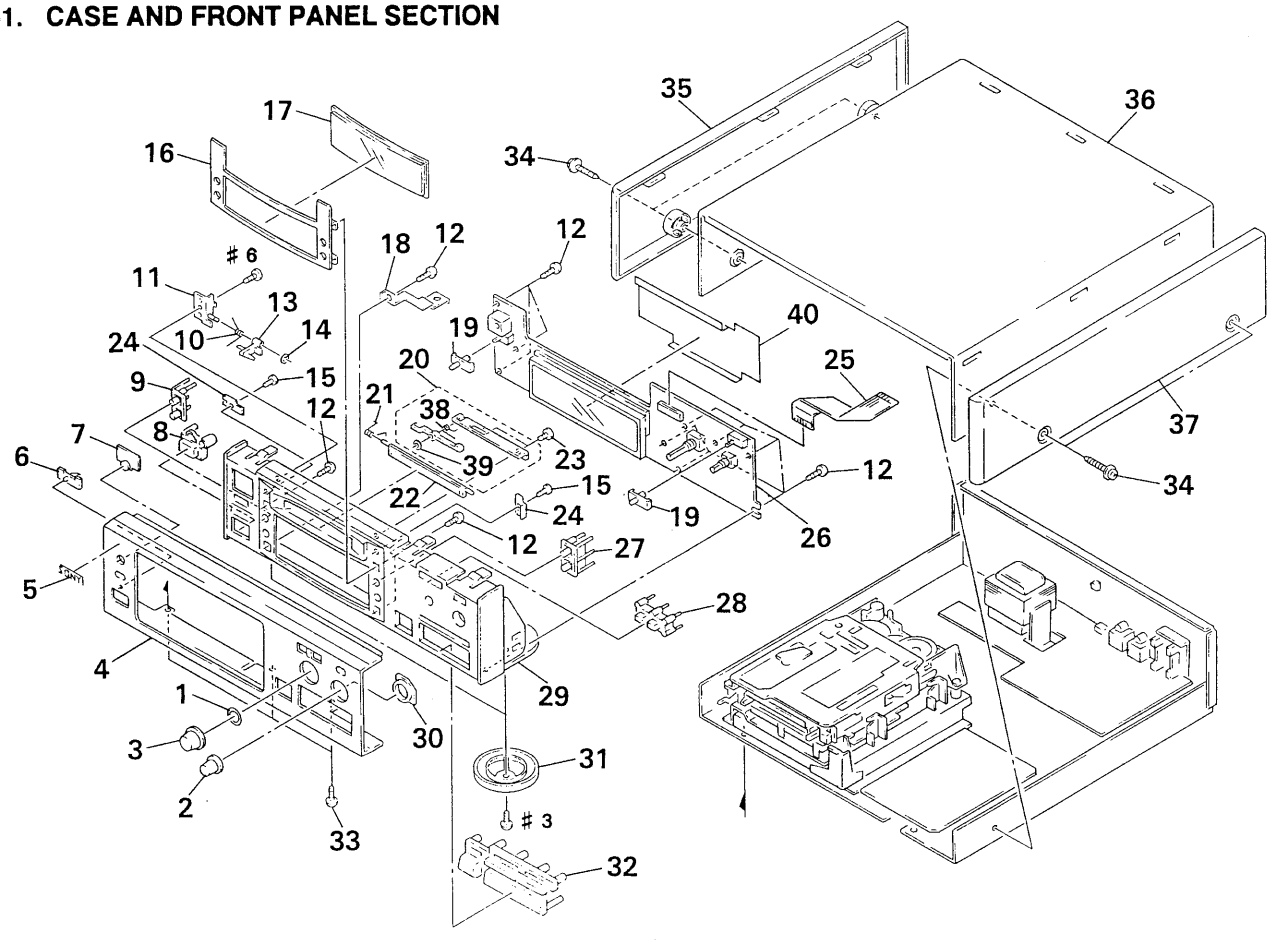


SECTION 4
EXPLODED VIEWS

NOTE:
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.
- Abbreviation
  SP : Singapore model
  JE : Tourist model

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

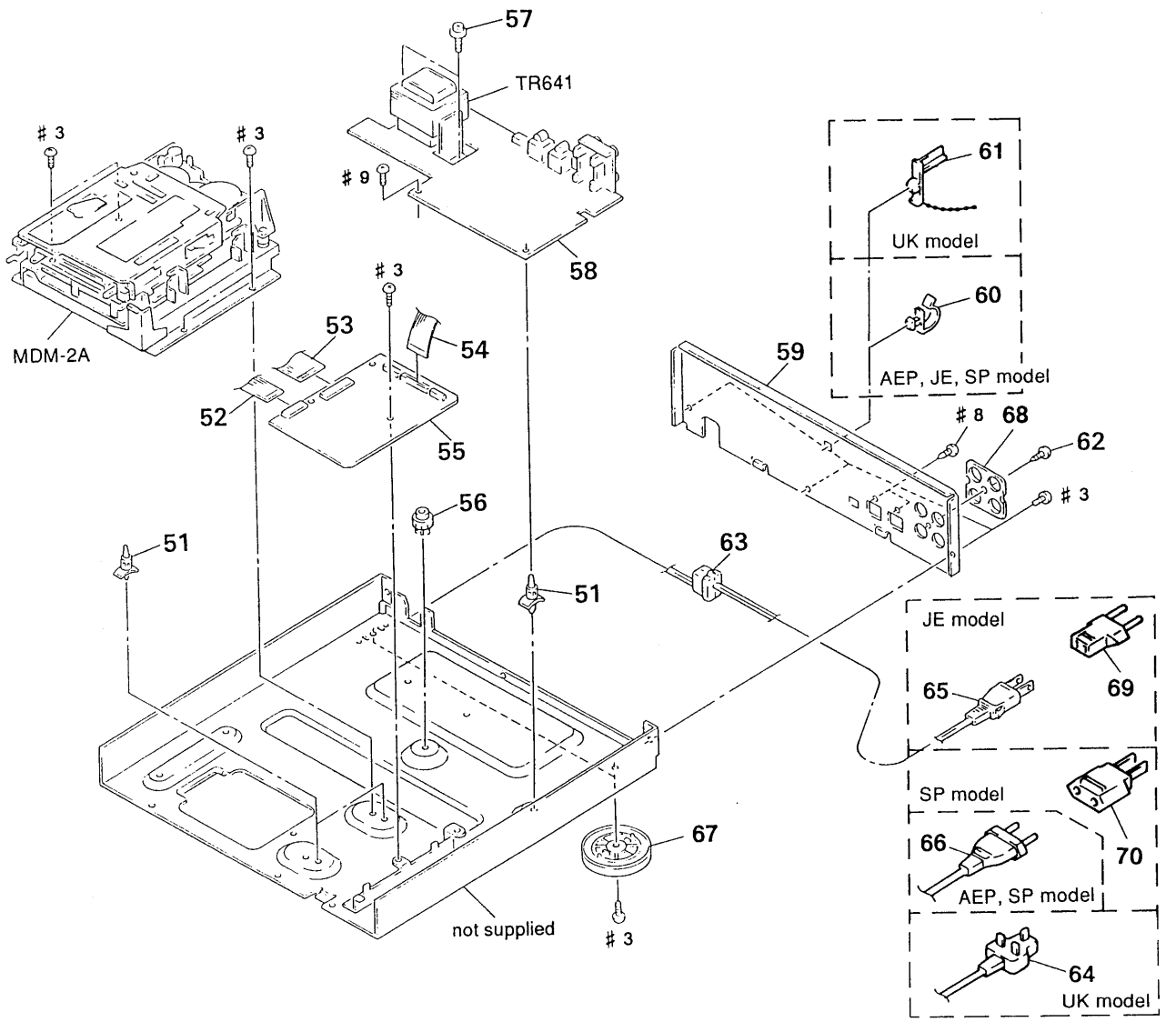
4-1. CASE AND FRONT PANEL SECTION



Ref. No.	Part No.	Description	Remark
1	3-354-981-01	SPRING (SUS), RING	
2	3-916-807-12	KNOB (REC)	
3	4-968-178-01	BUTTON (AMS)	
4	4-969-268-01	PANEL, FRONT	
5	4-969-961-11	EMBLEM (NO. 4), SONY	
6	4-969-275-01	INDICATOR	
7	4-968-092-01	FILTER	
8	4-969-262-01	BUTTON (POWER)	
9	4-969-265-01	BUTTON (REPEAT)	
10	4-969-215-01	SPRING, TORSION	
11	X-4945-242-1	BRACKET (LEVER LID) ASSY	
12	4-951-620-01	SCREW (2.6X8), +BVTP	
13	4-969-213-01	LEVER (LID)	
14	3-681-678-00	WASHER, SLIT	
15	4-887-321-11	SCREW (B1.7)(G), TAPPING	
16	4-969-269-01	PANEL (AL), INDICATION	
17	4-969-267-01	PLATE, INDICATION	
* 18	4-969-274-01	GROUND	
19	3-917-216-02	KNOB (TIMER)	
20	X-4945-420-1	BRACKET (LOCK LEVER) ASSY	

Ref. No.	Part No.	Description	Remark
21	4-969-236-01	SPRING (LID), TORSION	
22	4-969-226-11	LID (CARTRIDGE)	
23	4-908-618-21	SCREW (+BTP)(2X6)	
24	4-969-235-01	BRACKET (LID)	
25	1-769-122-11	WIRE (FLAT TYPE)(22 CORE)	
* 26	A-4673-291-A	DISPLAY BOARD, COMPLETE	
27	4-969-264-01	BUTTON (P-M)	
28	4-969-266-01	BUTTON (N/Y)	
29	4-969-261-01	PANEL, MOLD	
30	4-970-052-01	RING, ORNAMENTAL	
31	X-4945-079-1	RING ASSY, FOOT	
32	X-4945-405-1	BUTTON ASSY	
33	3-704-515-21	SCREW (BV/RING)	
34	4-969-954-01	SCREW (SIDE PANEL)	
35	X-4945-476-1	PANEL (L) ASSY, SIDE	
36	4-967-150-51	CASE	
37	X-4945-477-1	PANEL (R) ASSY, SIDE	
38	4-970-768-01	SPRING, TORSION	
39	3-315-384-31	WASHER, STOPPER	
40	4-972-446-02	INSULATOR	

4-2. CHASSIS SECTION

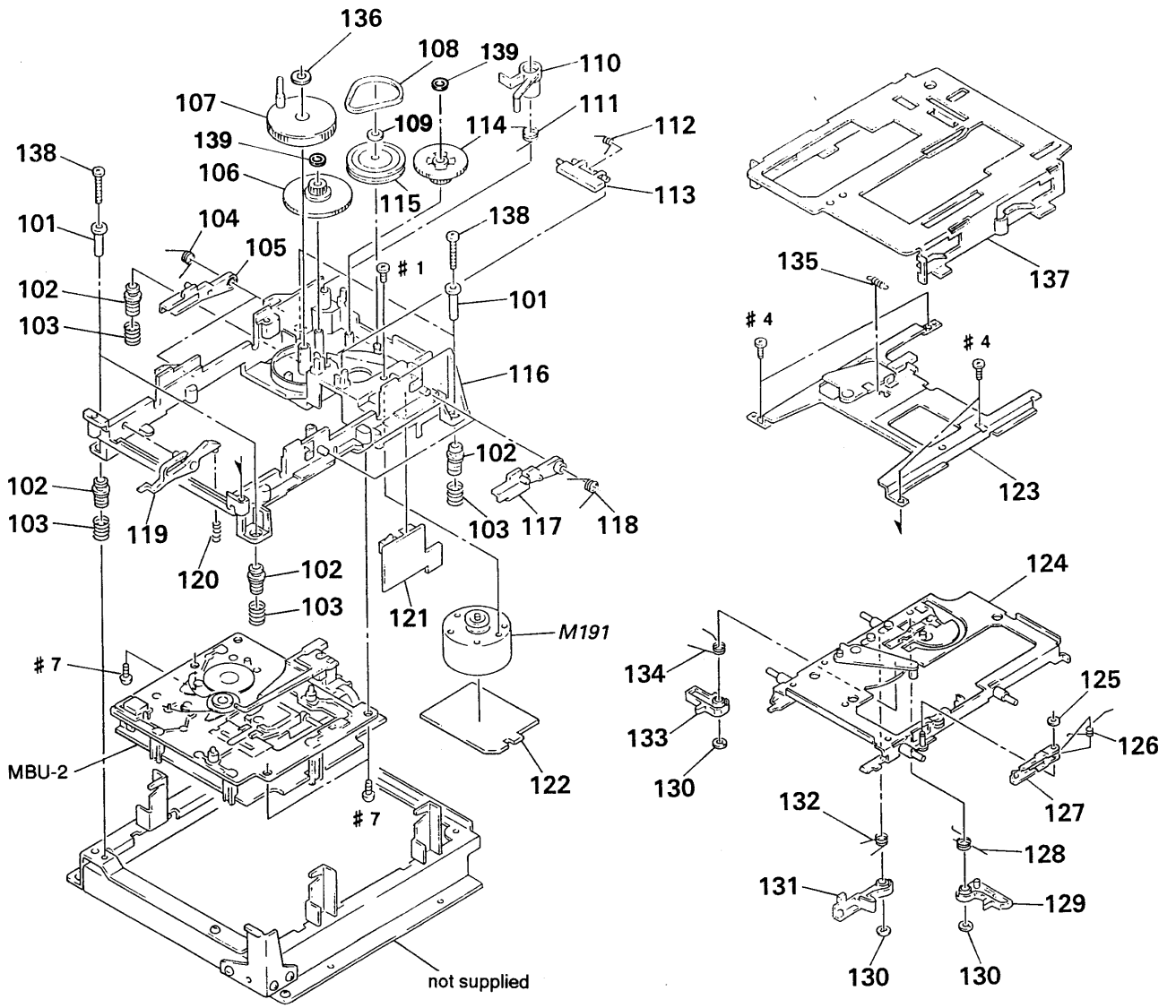


The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
51	3-703-353-03	SUPPORT, PC BOARD	
52	1-769-119-11	WIRE (FLAT TYPE) (18 CORE)	
53	1-769-118-11	WIRE (FLAT TYPE) (30 CORE)	
54	1-769-125-11	WIRE (FLAT TYPE) (22 CORE)	
* 55	A-4673-555-A	DIGITAL BOARD, COMPLETE	
* 56	4-968-100-01	SUPPORT, PC	
57	2-383-566-00	SCREW	
* 58	A-4673-258-A	POWER BOARD, COMPLETE (JE, SP)	
* 58	A-4673-292-A	POWER BOARD, COMPLETE (AEP, UK)	
* 59	4-969-270-21	PANEL, BACK (JE, SP)	
* 59	4-969-270-11	PANEL, BACK (AEP)	
* 59	4-969-270-31	PANEL, BACK (UK)	
* 60	4-949-235-01	HOOK (AEP, JE, SP)	
61	4-956-370-02	BAND, PLUG FIXED (UK)	
62	3-704-515-41	SCREW (BV/RING)	

Ref. No.	Part No.	Description	Remark
* 63	3-703-244-00	BUSHING (2104), CORD (AEP, UK, SP)	
* 63	3-703-571-11	BUSHING (S) (4516), CORD (JE)	
⚠64	1-696-586-11	CORD, POWER (UK)	
⚠65	1-751-621-21	CORD, POWER (JE)	
⚠66	1-575-651-21	CORD, POWER (AEP, SP)	
67	X-4945-129-1	FOOT ASSY	
* 68	4-970-588-11	PLATE (PIN JACK 4P), INDICATION	
⚠69	1-569-007-11	ADAPTER, CONVERSION 2P (JE)	
⚠70	1-569-008-11	ADAPTER, CONVERSION 2P (SP)	
⚠TR641	1-427-898-11	TRANSFORMER, POWER (AEP, UK)	
⚠TR641	1-427-899-11	TRANSFORMER, POWER (JE, SP)	

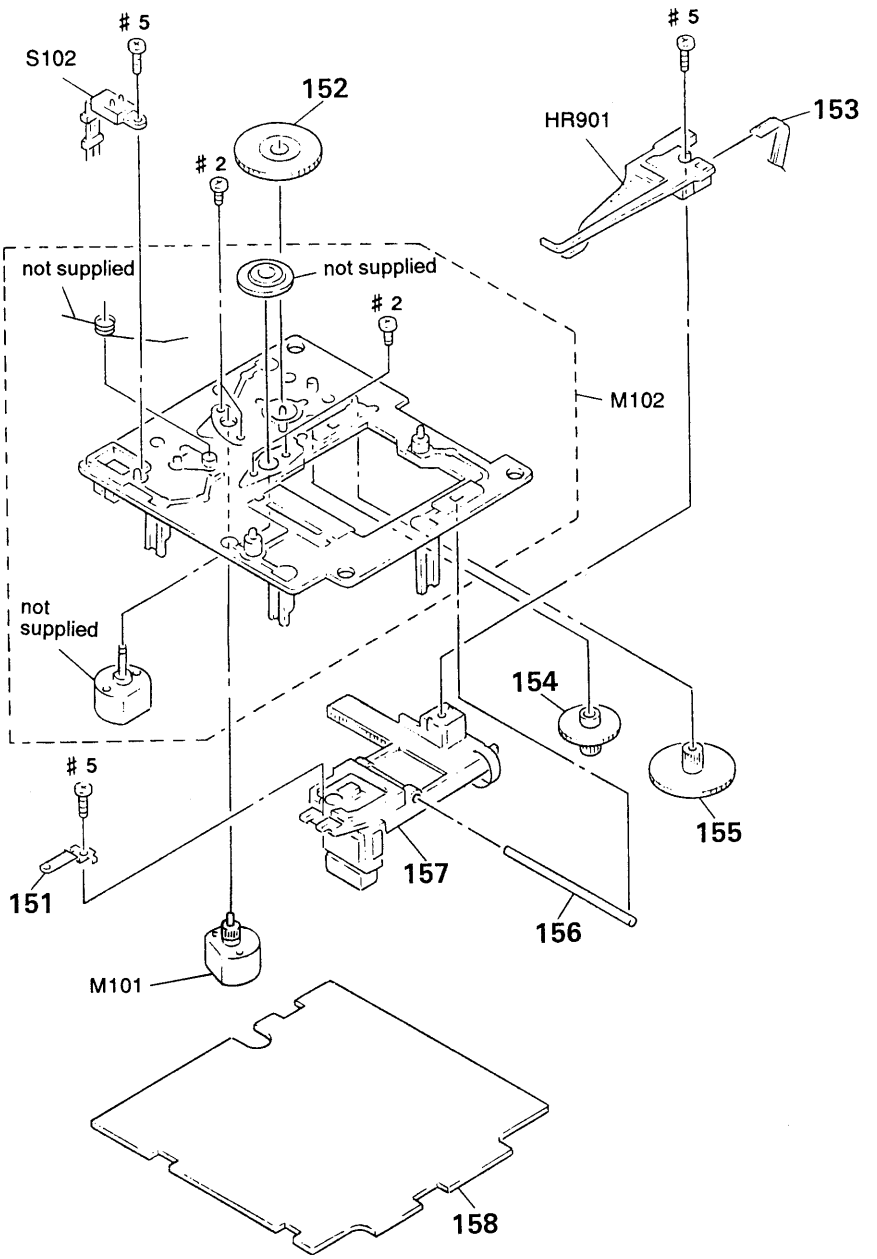
4-3. MECHANISM SECTION (MDM-2A)



Ref. No.	Part No.	Description	Remark
101	4-967-672-01	COLLAR (DAMPER)	
102	4-967-671-01	INSULATOR (MD)	
103	4-967-673-01	SPRING, COMPRESSION	
104	4-967-668-01	SPRING (UDL), TORSION	
105	4-967-667-01	LEVER (UDL)	
106	4-967-655-01	GEAR (BD-B)	
107	X-4945-069-1	CAM ASSY	
108	4-967-656-01	BELT (BD)	
109	4-968-919-31	WASHER, STOPPER	
110	4-967-637-01	LEVER (SLM)	
111	4-967-638-01	SPRING (SLM), TORSION	
112	4-968-273-01	SPRING (OWH), TORSION	
113	4-968-272-01	LEVER (OWH)	
114	4-967-654-01	GEAR (BD-A)	
115	4-957-794-01	PULLEY (GEAR 1)	
* 116	X-4945-068-1	BASE (BD) ASSY	
117	4-967-669-01	LEVER (UDR)	
118	4-967-670-01	SPRING (UDR), TORSION	
119	4-967-657-01	LEVER (DOOR)	
120	4-970-710-01	SPRING, COMPRESSION	

Ref. No.	Part No.	Description	Remark
* 121	1-653-411-11	DETECTION SW BOARD	
* 122	1-653-412-11	MOTOR BOARD	
123	A-4660-647-B	BRACKET (LVO) ASSY	
* 124	X-4945-067-1	HOLDER ASSY	
125	4-968-919-11	WASHER, STOPPER	
126	4-967-646-01	SPRING (SHT), TORSION	
127	4-967-645-01	LEVER (SHT)	
128	4-967-640-01	SPRING (LM), TORSION	
129	4-967-639-01	LEVER (LM)	
130	4-968-919-01	WASHER, STOPPER	
131	4-967-641-01	LEVER (L)	
132	4-967-642-01	SPRING (L), TORSION	
133	4-967-643-01	LEVER (LS)	
134	4-967-644-01	SPRING (LS), TORSION	
135	4-971-743-02	SPRING, TENSION	
136	4-968-919-21	WASHER, STOPPER	
* 137	X-4945-872-1	SLIDER (M) ASSY	
138	4-972-910-01	SCREW (2.6X18), +B	
139	4-968-919-41	WASHER, STOPPER	
M191	A-4660-646-A	MOTOR ASSY (LOADING)	

4-4. BASE UNIT SECTION (MBU-2)



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
151	4-967-679-01	SPRING (OP), LEAF	
152	4-967-675-01	GEAR (SL-A)	
153	1-654-446-11	OWH FLEXIBLE BOARD	
154	4-967-676-01	GEAR (SL-B)	
155	4-967-677-01	GEAR (SL-C)	
156	4-967-678-01	SHAFT (OP)	
⚠157	8-583-009-11	DEVICE, MINI DISK KMS-210A/J-N	
* 158	A-4673-174-A	BD BOARD, COMPLETE	
HR901	1-500-175-11	HEAD, OVER LIGHT (RF322-74A)	
M101	A-4660-651-A	MOTOR ASSY (SLED)	
M102	A-4660-650-A	CHASSIS ASSY, BU (SPINDLE)	
S102	1-762-148-11	SWITCH, PUSH (2 KEY) (REFLECT/PROTECT)	

BD

SECTION 5
ELECTRICAL PARTS LIST

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
- SEMICONDUCTORS
  In each case, u: μ , for example:
  uA...: μA..., uPA...: μPA..., uPB...: μPB..., uPC...: μPC..., uPD...: μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH
- Abbreviation
  SP : Singapore model
  JE : Tourist model

Ref. No.	Part No.	Description			Remark
*	A-4673-174-A	BD BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C101	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C102	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C103	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C104	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C105	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C106	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C107	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C108	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C109	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C111	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C112	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C113	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C114	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C115	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C116	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C117	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C119	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C121	1-126-395-11	ELECT	22uF	20%	16V
C122	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C123	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C124	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C125	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C126	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C127	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C128	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C129	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V
C130	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C131	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C132	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C133	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C134	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C135	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C136	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C141	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C142	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C143	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C144	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C151	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C152	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C155	1-104-916-11	TANTAL. CHIP	6.8uF	20%	20V
C160	1-104-601-11	ELECT CHIP	10uF	20%	10V
C161	1-104-601-11	ELECT CHIP	10uF	20%	10V
C163	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C164	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C166	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C167	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C168	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C169	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C170	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C171	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C175	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C176	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C177	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C178	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C181	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C182	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C183	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C184	1-107-836-11	ELECT CHIP	22uF	20%	8V
C185	1-164-611-11	CERAMIC CHIP	0.001uF	10%	500V
C186	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C191	1-126-395-11	ELECT	22uF	20%	16V
C192	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C193	1-164-346-11	CERAMIC CHIP	1uF		16V
C194	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
		< CONNECTOR >			
CN101	1-766-508-11	CONNECTOR, FFC/FPC (ZIF) 22P			
CN102	1-766-510-21	CONNECTOR, FFC/FPC 30P			
CN103	1-766-509-21	CONNECTOR, FFC/FPC 18P			
CN104	1-766-898-21	HOUSING, CONNECTOR(PC BOARD)4P			
		< DIODE >			
D101	8-719-988-62	DIODE 1SS355			
D155	8-719-031-17	DIODE 1SS322			
D161	8-719-421-15	DIODE MA8027-L			
D181	8-719-033-60	DIODE F1P2STP			
D183	8-719-033-60	DIODE F1P2STP			
		< IC >			
IC101	8-752-072-68	IC CXA1981AR			
IC102	8-759-243-19	IC TC7SU04F			
IC121	8-752-375-06	IC CXD2535AR			

BD

Ref. No.	Part No.	Description	Remark
IC122	8-759-243-19	IC TC7SU04F	
IC151	8-759-179-60	IC MPC17A38VMEL	
IC171	8-759-504-12	IC X24C01S	
IC172	8-759-149-73	IC uPC842G2	
IC181	8-759-095-65	IC TC74ACT540FS	
IC182	8-759-243-19	IC TC7SU04F	
IC191	8-759-822-99	IC L88MS05T-FA	
		< COIL/RESISTOR >	
L101	1-414-234-11	INDUCTOR, FERRITE BEAD	
L102	1-414-234-11	INDUCTOR, FERRITE BEAD	
L103	1-414-234-11	INDUCTOR, FERRITE BEAD	
L105	1-414-234-11	INDUCTOR, FERRITE BEAD	
L106	1-414-234-11	INDUCTOR, FERRITE BEAD	
L110	1-216-295-00	METAL CHIP 0 5% 1/10W	
L121	1-414-234-11	INDUCTOR, FERRITE BEAD	
L122	1-412-039-51	INDUCTOR CHIP 100uH	
L151	1-412-622-51	INDUCTOR 10uH	
L152	1-412-622-51	INDUCTOR 10uH	
L153	1-412-039-51	INDUCTOR CHIP 100uH	
L154	1-412-039-51	INDUCTOR CHIP 100uH	
L155	1-410-980-51	INDUCTOR CHIP 1mH	
L161	1-414-234-11	INDUCTOR, FERRITE BEAD	
L162	1-414-234-11	INDUCTOR, FERRITE BEAD	
L195	1-233-316-21	FILTER, CHIP EMI	
		< MOTOR >	
M101	A-4660-651-A	MOTOR ASSY (SLED)	
M102	A-4660-650-A	CHASSIS ASSY, BU (SPINDLE)	
		< TRANSISTOR >	
Q101	8-729-905-12	TRANSISTOR DTA144EU	
Q151	8-729-905-18	TRANSISTOR DTC144EU	
Q162	8-729-101-07	TRANSISTOR 2SB798-DL	
Q163	8-729-905-12	TRANSISTOR DTA144EU	
Q164	8-729-924-19	TRANSISTOR DTA123JU	
Q181	8-729-018-75	TRANSISTOR 2SJ278MY	
Q182	8-729-017-65	TRANSISTOR 2SK1764KY	
		< RESISTOR >	
R101	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R102	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R103	1-208-806-11	METAL CHIP 10K 0.50% 1/10W	
R104	1-216-049-11	METAL CHIP 1K 5% 1/10W	
R105	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R106	1-216-133-00	METAL CHIP 3.3M 5% 1/10W	
R107	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R114	1-216-025-91	METAL CHIP 100 5% 1/10W	
R116	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R117	1-216-113-00	METAL CHIP 470K 5% 1/10W	

Ref. No.	Part No.	Description	Remark
R120	1-216-025-91	METAL CHIP 100 5% 1/10W	
R121	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R122	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R123	1-216-037-00	METAL CHIP 330 5% 1/10W	
R124	1-216-025-11	METAL CHIP 100 5% 1/10W	
R125	1-216-025-11	METAL CHIP 100 5% 1/10W	
R128	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R129	1-216-037-00	METAL CHIP 330 5% 1/10W	
R130	1-216-041-00	METAL CHIP 470 5% 1/10W	
R131	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R132	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R133	1-216-133-00	METAL CHIP 3.3M 5% 1/10W	
R134	1-216-037-00	METAL CHIP 330 5% 1/10W	
R135	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R136	1-216-041-00	METAL CHIP 470 5% 1/10W	
R137	1-216-025-11	METAL CHIP 100 5% 1/10W	
R139	1-216-017-00	METAL CHIP 47 5% 1/10W	
R140	1-216-017-00	METAL CHIP 47 5% 1/10W	
R142	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R143	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R144	1-216-025-11	METAL CHIP 100 5% 1/10W	
R145	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R146	1-216-037-00	METAL CHIP 330 5% 1/10W	
R147	1-216-025-91	METAL CHIP 100 5% 1/10W	
R148	1-216-045-00	METAL CHIP 680 5% 1/10W	
R151	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R152	1-216-295-00	METAL CHIP 0 5% 1/10W	
R153	1-216-295-00	METAL CHIP 0 5% 1/10W	
R161	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R162	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R163	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R164	1-216-045-00	METAL CHIP 680 5% 1/10W	
R165	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R166	1-220-250-11	METAL CHIP 10 5% 1/2W	
R167	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R168	1-218-236-11	METAL CHIP 1 10% 1/4W	
R170	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R171	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R172	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R174	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R176	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R178	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R181	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R182	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R183	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R184	1-216-296-00	METAL CHIP 0 5% 1/8W	
R186	1-216-296-00	METAL CHIP 0 5% 1/8W	
R195	1-216-295-00	METAL CHIP 0 5% 1/10W	

BD DETECTION SW DIGITAL

Ref.No.	Part No.	Description			Remark
		< VARIABLE RESISTOR >			
RV101	1-241-397-11	RES, ADJ, METAL GLAZE 47K			
RV102	1-241-395-11	RES, ADJ, METAL GLAZE 10K			
RV105	1-241-395-11	RES, ADJ, METAL GLAZE 10K			
		< SWITCH >			
S101	1-572-467-31	SWITCH, PUSH (1 KEY) (LIMIT)			
S102	1-762-148-11	SWITCH, PUSH (2 KEY) (REFLECT/PROTECT)			
**********					
*	1-653-411-11	DETECTION SW BOARD			
		**********			
		< CONNECTOR >			
CN193	1-770-010-21	CONNECTOR, BOARD TO BOARD 4P			
		< SWITCH >			
S191	1-762-149-11	SWITCH, PUSH (1 KEY) (LOAD OUT DET)			
S192	1-762-149-11	SWITCH, PUSH (1 KEY) (LOAD IN DET)			
S193	1-762-149-11	SWITCH, PUSH (1 KEY) (CHACKING IN DET)			
**********					
*	A-4673-555-A	DIGITAL BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C201	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C202	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C203	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C205	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C206	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C207	1-126-395-11	ELECT	22uF	20%	16V
C208	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C209	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C210	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C221	1-126-395-11	ELECT	22uF	20%	16V
C222	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C223	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C224	1-126-204-11	ELECT CHIP	47uF	20%	16V
C225	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C226	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C227	1-126-204-11	ELECT CHIP	47uF	20%	16V
C228	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C229	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C230	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C231	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C232	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C233	1-126-395-11	ELECT	22uF	20%	16V
C235	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C236	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C241	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C251	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C252	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C253	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C254	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C255	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C256	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C257	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C258	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C261	1-126-395-11	ELECT	22uF	20%	16V
C262	1-126-395-11	ELECT	22uF	20%	16V
C263	1-164-695-11	CERAMIC CHIP	0.0022uF	5%	50V
C264	1-164-695-11	CERAMIC CHIP	0.0022uF	5%	50V
C265	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C266	1-126-395-11	ELECT	22uF	20%	16V
C267	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C268	1-126-395-11	ELECT	22uF	20%	16V
C270	1-126-204-11	ELECT CHIP	47uF	20%	16V
C271	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C272	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C273	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C274	1-126-395-11	ELECT	22uF	20%	16V
C277	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C281	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C282	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C283	1-126-204-11	ELECT CHIP	47uF	20%	16V
C284	1-126-204-11	ELECT CHIP	47uF	20%	16V
C285	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C286	1-126-204-11	ELECT CHIP	47uF	20%	16V
C287	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C288	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C289	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C290	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C291	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C292	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C293	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C294	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C295	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C296	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C297	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C299	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C300	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C301	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C302	1-126-204-11	ELECT CHIP	47uF	20%	16V
C304	1-126-204-11	ELECT CHIP	47uF	20%	16V
C305	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C307	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C309	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C311	1-126-395-11	ELECT	22uF	20%	16V

Ref.No.	Part No.	Description			Remark
C312	1-126-395-11	ELECT	22uF	20%	16V
C313	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C314	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C315	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C316	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C317	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C318	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C319	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C320	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C321	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C322	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C326	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C328	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C330	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C332	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C334	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C335	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C336	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C337	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C338	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C527	1-163-038-00	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR >			
* CN201	1-766-899-11	CONNECTOR 22P			
CN202	1-766-510-21	CONNECTOR, FFC/FPC 30P			
CN221	1-766-509-21	CONNECTOR, FFC/FPC 18P			
* CN222	1-770-154-11	PIN, CONNECTOR (PC BOARD) 6P			
* CN223	1-766-899-11	CONNECTOR 22P			
* CN251	1-770-154-11	PIN, CONNECTOR (PC BOARD) 6P			
* CN281	1-770-153-11	PIN, CONNECTOR (PC BOARD) 8P			
		< DIODE >			
D201	8-719-016-74	DIODE 1SS352			
D251	8-719-974-98	DIODE HVM17-01			
		< FERRITE BEAD >			
FB201	1-550-907-21	BEAD, FERRITE (CHIP)			
FB252	1-550-907-21	BEAD, FERRITE (CHIP)			
FB254	1-550-907-21	BEAD, FERRITE (CHIP)			
FB256	1-550-907-21	BEAD, FERRITE (CHIP)			
FB257	1-550-907-21	BEAD, FERRITE (CHIP)			
FB258	1-500-056-21	BEAD, FERRITE (CHIP)			
FB340	1-543-948-11	BEAD, FERRITE (CHIP)			
		< IC >			
IC201	8-759-344-28	IC M37610MD-052FP			
IC202	8-759-256-59	IC SN74HC00FPEL			
IC221	8-752-371-17	IC CXD2536R			
IC222	8-759-294-78	IC MSM514400BSJADR1-K			
IC241	8-759-040-83	IC BA6287F			
IC251	8-759-158-96	IC TC9246F			
IC258	8-759-242-70	IC TC7WU04F			
IC261	8-759-331-35	IC AK5340-VS			
IC262	8-759-097-92	IC NJM2100V			
IC263	8-759-252-90	IC TLV2362IPW-ELM1500			
IC281	8-752-359-50	IC CXD2564AM			
IC282	8-759-908-17	IC TL082CPS			
		< COIL >			
L221	1-410-389-31	INDUCTOR CHIP	47uH		
L241	1-412-622-51	INDUCTOR	10uH		
L251	1-412-332-41	INDUCTOR	2.2uH		
L258	1-412-336-41	INDUCTOR	4.7uH		
L281	1-412-336-41	INDUCTOR	4.7uH		
L282	1-412-336-41	INDUCTOR	4.7uH		
L285	1-410-387-11	INDUCTOR CHIP	33uH		
L287	1-412-336-41	INDUCTOR	4.7uH		
		< TRANSISTOR >			
Q261	8-729-421-19	TRANSISTOR UN2213			
Q321	8-729-421-19	TRANSISTOR UN2213			
Q322	8-729-421-19	TRANSISTOR UN2213			
		< RESISTOR >			
R201	1-216-097-00	METAL CHIP	100K	5%	1/10W
R202	1-216-097-00	METAL CHIP	100K	5%	1/10W
R203	1-216-025-91	METAL CHIP	100	5%	1/10W
R204	1-216-097-00	METAL CHIP	100K	5%	1/10W
R205	1-216-073-00	METAL CHIP	10K	5%	1/10W
R206	1-216-073-00	METAL CHIP	10K	5%	1/10W
R207	1-216-073-00	METAL CHIP	10K	5%	1/10W
R208	1-216-097-00	METAL CHIP	100K	5%	1/10W
R209	1-216-097-00	METAL CHIP	100K	5%	1/10W
R210	1-216-073-00	METAL CHIP	10K	5%	1/10W
R211	1-216-097-00	METAL CHIP	100K	5%	1/10W
R214	1-216-073-00	METAL CHIP	10K	5%	1/10W
R215	1-216-097-00	METAL CHIP	100K	5%	1/10W
R216	1-216-073-00	METAL CHIP	10K	5%	1/10W
R217	1-216-073-00	METAL CHIP	10K	5%	1/10W
R218	1-216-073-00	METAL CHIP	10K	5%	1/10W
R219	1-216-073-00	METAL CHIP	10K	5%	1/10W
R220	1-216-073-00	METAL CHIP	10K	5%	1/10W
R221	1-216-097-00	METAL CHIP	100K	5%	1/10W
R222	1-216-097-00	METAL CHIP	100K	5%	1/10W
R223	1-216-097-00	METAL CHIP	100K	5%	1/10W
R224	1-216-097-00	METAL CHIP	100K	5%	1/10W
R225	1-216-097-00	METAL CHIP	100K	5%	1/10W
R226	1-216-041-00	METAL CHIP	470	5%	1/10W
R227	1-216-033-00	METAL CHIP	220	5%	1/10W
R228	1-216-033-00	METAL CHIP	220	5%	1/10W

DIGITAL

Ref.No.	Part No.	Description				Remark
R229	1-216-295-00	METAL CHIP	0	5%	1/10W	
R230	1-216-033-00	METAL CHIP	220	5%	1/10W	
R231	1-216-295-00	METAL CHIP	0	5%	1/10W	
R232	1-216-295-00	METAL CHIP	0	5%	1/10W	
R233	1-216-033-00	METAL CHIP	220	5%	1/10W	
R234	1-216-295-00	METAL CHIP	0	5%	1/10W	
R236	1-216-295-00	METAL CHIP	0	5%	1/10W	
R241	1-216-021-00	METAL CHIP	68	5%	1/10W	
R242	1-216-021-00	METAL CHIP	68	5%	1/10W	
R251	1-216-651-11	METAL CHIP	1K	0.5%	1/10W	
R252	1-216-651-11	METAL CHIP	1K	0.5%	1/10W	
R253	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R256	1-216-037-00	METAL CHIP	330	5%	1/10W	
R257	1-208-810-11	METAL CHIP	15K	0.50%	1/10W	
R258	1-208-810-11	METAL CHIP	15K	0.50%	1/10W	
R259	1-208-810-11	METAL CHIP	15K	0.50%	1/10W	
R260	1-208-810-11	METAL CHIP	15K	0.50%	1/10W	
R261	1-216-663-11	METAL CHIP	3.3K	0.5%	1/10W	
R262	1-216-663-11	METAL CHIP	3.3K	0.5%	1/10W	
R263	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R264	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R265	1-216-639-11	METAL CHIP	330	0.5%	1/10W	
R266	1-216-639-11	METAL CHIP	330	0.5%	1/10W	
R267	1-216-639-11	METAL CHIP	330	0.5%	1/10W	
R268	1-216-639-11	METAL CHIP	330	0.5%	1/10W	
R269	1-208-822-11	METAL CHIP	47K	0.50%	1/10W	
R270	1-208-822-11	METAL CHIP	47K	0.50%	1/10W	
R271	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R272	1-216-033-00	METAL CHIP	220	5%	1/10W	
R273	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R274	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R275	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R276	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R281	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R282	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R283	1-208-814-11	METAL CHIP	22K	0.50%	1/10W	
R284	1-208-814-11	METAL CHIP	22K	0.50%	1/10W	
R285	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R286	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R287	1-208-814-11	METAL CHIP	22K	0.50%	1/10W	
R288	1-208-814-11	METAL CHIP	22K	0.50%	1/10W	
R289	1-216-695-11	METAL CHIP	68K	0.5%	1/10W	
R290	1-216-695-11	METAL CHIP	68K	0.5%	1/10W	
R291	1-216-695-11	METAL CHIP	68K	0.5%	1/10W	
R292	1-216-695-11	METAL CHIP	68K	0.5%	1/10W	
R293	1-216-295-00	METAL CHIP	0	5%	1/10W	
R294	1-216-041-00	METAL CHIP	470	5%	1/10W	
R295	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R303	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R304	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R305	1-216-295-00	METAL CHIP	0	5%	1/10W	
R306	1-216-295-00	METAL CHIP	0	5%	1/10W	
R307	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R308	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R309	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R310	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R311	1-216-295-00	METAL CHIP	0	5%	1/10W	
R312	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R313	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R314	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R315	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R316	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R317	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R318	1-216-049-11	METAL CHIP	1K	5%	1/10W	
R319	1-216-049-11	METAL CHIP	1K	5%	1/10W	
R320	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R321	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R322	1-216-049-11	METAL CHIP	1K	5%	1/10W	
R323	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R325	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R326	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R327	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R328	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R329	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R330	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R331	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R332	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R333	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R334	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R335	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R336	1-216-049-11	METAL CHIP	1K	5%	1/10W	
R337	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R338	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R339	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R341	1-216-295-00	METAL CHIP	0	5%	1/10W	
R342	1-216-295-00	METAL CHIP	0	5%	1/10W	
R343	1-216-041-00	METAL CHIP	470	5%	1/10W	
R344	1-550-907-21	BEAD, FERRITE (CHIP)				
R345	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R346	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R347	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R350	1-216-041-00	METAL CHIP	470	5%	1/10W	
R353	1-216-295-00	METAL CHIP	0	5%	1/10W	
R359	1-216-295-00	METAL CHIP	0	5%	1/10W	
R361	1-216-295-00	METAL CHIP	0	5%	1/10W	
R362	1-216-296-00	METAL CHIP	0	5%	1/8W	
R381	1-216-295-00	METAL CHIP	0	5%	1/10W	
R381	1-216-295-00	METAL CHIP	0	5%	1/10W	
R383	1-216-295-00	METAL CHIP	0	5%	1/10W	
R384	1-216-295-00	METAL CHIP	0	5%	1/10W	

Ref. No.	Part No.	Description				Remark
R386	1-216-295-00	METAL CHIP	0	5%	1/10W	
		< VIBRATOR >				
X201	1-760-493-11	VIBRATOR, CERAMIC (CHIP TYPE)(8MHz)				
X203	1-760-173-11	VIBRATOR, CRYSTAL (45MHz)				
**********						
*	A-4673-291-A	DISPLAY BOARD, COMPLETE				
		**********				
	2-389-320-01	CUSHION				
		< CAPACITOR >				
C705	1-162-306-11	CERAMIC	0.01uF	30%	16V	
C706	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C707	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C708	1-164-159-11	CERAMIC	0.1uF		50V	
C709	1-124-234-00	ELECT	22uF	20%	16V	
C710	1-162-282-31	CERAMIC	100PF	10%	50V	
C711	1-164-159-11	CERAMIC	0.1uF		50V	
C712	1-164-159-11	CERAMIC	0.1uF		50V	
C713	1-162-302-11	CERAMIC	0.0022uF	30%	16V	
C714	1-162-302-11	CERAMIC	0.0022uF	30%	16V	
C715	1-161-494-00	CERAMIC	0.022uF		25V	
C716	1-161-494-00	CERAMIC	0.022uF		25V	
C717	1-126-163-11	ELECT	4.7uF	20%	50V	
C718	1-164-159-11	CERAMIC	0.1uF		50V	
C719	1-164-159-11	CERAMIC	0.1uF		50V	
C720	1-164-159-11	CERAMIC	0.1uF		50V	
C721	1-162-294-31	CERAMIC	0.001uF	10%	50V	
		< CONNECTOR >				
CN701	1-770-204-11	CONNECTOR, FFC/FPC 22P				
		< DIODE >				
D701	8-719-313-40	LED SEL1516W (ON/STANDBY)				
		< FLUORESCENT INDICATOR >				
FL701	1-517-353-11	INDICATOR TUBE, FLUORESCENT				
		< HOLDER >				
* FLH701	4-956-134-01	HOLDER (FL TUBE)				
		< IC >				
IC701	8-759-297-23	IC M66004M8FP				
IC702	8-741-810-59	IC ELEMENT, RAY-CATCHER SBX1810-59 (R)				

Ref. No.	Part No.	Description				Remark
		< TRANSISTOR >				
Q701	8-729-900-61	TRANSISTOR DTA114ES				
		< RESISTOR >				
R701	1-249-429-11	CARBON	10K	5%	1/4W	
R702	1-249-429-11	CARBON	10K	5%	1/4W	
R705	1-249-435-11	CARBON	33K	5%	1/4W	
R706	1-249-417-11	CARBON	1K	5%	1/4W	F
R707	1-249-429-11	CARBON	10K	5%	1/4W	
R708	1-249-429-11	CARBON	10K	5%	1/4W	
R709	1-249-429-11	CARBON	10K	5%	1/4W	
R711	1-249-411-11	CARBON	330	5%	1/4W	
R712	1-249-415-11	CARBON	680	5%	1/4W	F
R721	1-247-807-31	CARBON	100	5%	1/4W	
R722	1-247-807-31	CARBON	100	5%	1/4W	
R723	1-247-807-31	CARBON	100	5%	1/4W	
R724	1-247-807-31	CARBON	100	5%	1/4W	
R741	1-249-429-11	CARBON	10K	5%	1/4W	
R751	1-249-429-11	CARBON	10K	5%	1/4W	
R752	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R753	1-249-423-11	CARBON	3.3K	5%	1/4W	F
R754	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R755	1-249-429-11	CARBON	10K	5%	1/4W	
R756	1-249-435-11	CARBON	33K	5%	1/4W	
R761	1-249-429-11	CARBON	10K	5%	1/4W	
R762	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R763	1-249-423-11	CARBON	3.3K	5%	1/4W	F
R764	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R771	1-249-429-11	CARBON	10K	5%	1/4W	
R772	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R773	1-249-423-11	CARBON	3.3K	5%	1/4W	F
R774	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R775	1-249-429-11	CARBON	10K	5%	1/4W	
R776	1-249-435-11	CARBON	33K	5%	1/4W	
		< VARIABLE RESISTOR >				
RV702	1-223-799-11	RES, VAR, CARBON 20K/20K (REC LEVEL)				
		< SWITCH >				
S701	1-467-818-11	ENCODER, ROTARY (⏮ AMS ⏭, PUSH ENTER)				
S702	1-572-624-11	SWITCH, SLIDE (INPUT)				
S703	1-571-296-11	SWITCH, SLIDE (TIMER)				
S751	1-554-303-21	SWITCH, TACTILE (EDIT NO)				
S752	1-554-303-21	SWITCH, TACTILE (YES)				
S756	1-554-303-21	SWITCH, TACTILE (DISPLAY)				
S761	1-554-303-21	SWITCH, TACTILE (PLAY MODE)				
S762	1-554-303-21	SWITCH, TACTILE (REPEAT)				
S763	1-554-303-21	SWITCH, TACTILE (CLOCK SET)				
S764	1-554-303-21	SWITCH, TACTILE (POWER)				

DISPLAY | MOTOR | OWH FLEXIBLE | POWER

Ref.No.	Part No.	Description			Remark
S771	1-554-303-21	SWITCH, TACTILE (●)			
S772	1-554-303-21	SWITCH, TACTILE (■)			
S773	1-554-303-21	SWITCH, TACTILE (▷‖)			
S774	1-554-303-21	SWITCH, TACTILE (▶▶)			
S775	1-554-303-21	SWITCH, TACTILE (◀◀)			
S776	1-554-303-21	SWITCH, TACTILE (⏏)			
**********					
*	1-653-412-11	MOTOR BOARD			
		**********			
		< CONNECTOR >			
* CN191	1-568-944-11	PIN, CONNECTOR 6P			
CN192	1-770-011-41	CONNECTOR, BOARD TO BOARD 4P			
		< MOTOR >			
M191	A-4660-646-A	MOTOR ASSY (LOADING)			
**********					
	1-654-466-11	OWH FLEXIBLE BOARD			
		**********			
		< HEAD >			
HR901	1-500-175-11	HEAD, OVER LIGHT (RF322-74A)			
**********					
*	A-4673-258-A	POWER BOARD, COMPLETE (JE, SP)			
		**********			
*	A-4673-292-A	POWER BOARD, COMPLETE (AEP, UK)			
		**********			
*	1-535-303-00	WIRE, JUMPER			
*	3-309-144-21	HEAT SINK			
*	4-363-146-21	HEAT SINK, V.OUT			
	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3			
	7-682-548-09	SCREW +BVTT 3X8 (S)			
		< CAPACITOR >			
C501	1-163-031-11	CERAMIC CHIP	0.01uF	50V	
C502	1-163-031-11	CERAMIC CHIP	0.01uF	50V	
C503	1-124-572-11	ELECT	100uF 20%	63V	
C504	1-165-319-11	CERAMIC CHIP	0.1uF	50V	
C505	1-104-773-11	ELECT	22000uF 20%	16V	
C506	1-124-898-11	ELECT	4700uF 20%	16V	
C507	1-124-916-11	ELECT	22uF 20%	63V	
C508	1-124-485-11	ELECT	330uF 20%	35V	(JE, SP)
C508	1-126-950-11	ELECT	330uF 20%	35V	(AEP, UK)
C511	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C512	1-124-903-11	ELECT	1uF 20%	50V	

Ref.No.	Part No.	Description			Remark
C513	1-124-994-11	ELECT	100uF 20%	10V	(AEP, UK)
C513	1-126-101-11	ELECT	100uF 20%	16V	(JE, SP)
C514	1-126-101-11	ELECT	100uF 20%	16V	
C515	1-126-939-11	ELECT	10000uF 20%	16V	
C516	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C521	1-124-907-11	ELECT	10uF 20%	50V	
C522	1-124-907-11	ELECT	10uF 20%	50V	
C523	1-163-033-91	CERAMIC CHIP	0.022uF	50V	
C524	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C531	1-124-907-11	ELECT	10uF 20%	50V	
C532	1-110-489-11	DOUBLE LAYER	1.0F	5.5V	
C533	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C534	1-124-927-11	ELECT	4.7uF 20%	100V	
C535	1-124-903-11	ELECT	1uF 20%	50V	
C541	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C542	1-124-994-11	ELECT	100uF 20%	10V	(AEP, UK)
C542	1-126-101-11	ELECT	100uF 20%	16V	(JE, SP)
C551	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C552	1-124-994-11	ELECT	100uF 20%	10V	(AEP, UK)
C552	1-126-101-11	ELECT	100uF 20%	16V	(JE, SP)
C561	1-126-023-11	ELECT	100uF 20%	16V	
C562	1-126-023-11	ELECT	100uF 20%	16V	
C563	1-124-903-11	ELECT	1uF 20%	50V	
C564	1-124-903-11	ELECT	1uF 20%	50V	
C565	1-163-009-11	CERAMIC CHIP	0.001uF 10%	50V	
C566	1-124-903-11	ELECT	1uF 20%	50V	
C567	1-124-994-11	ELECT	100uF 20%	10V	
C568	1-124-994-11	ELECT	100uF 20%	10V	
C571	1-163-017-00	CERAMIC CHIP	0.0047uF 5%	50V	
C572	1-163-017-00	CERAMIC CHIP	0.0047uF 5%	50V	
C573	1-163-145-00	CERAMIC CHIP	0.0015uF 5%	50V	
C574	1-163-145-00	CERAMIC CHIP	0.0015uF 5%	50V	
C575	1-164-004-11	CERAMIC CHIP	0.1uF 10%	25V	
C576	1-164-004-11	CERAMIC CHIP	0.1uF 10%	25V	
C577	1-124-910-11	ELECT	47uF 20%	50V	
C578	1-124-910-11	ELECT	47uF 20%	50V	
C579	1-163-025-11	CERAMIC CHIP	0.001uF	50V	
C580	1-163-025-11	CERAMIC CHIP	0.001uF	50V	
C611	1-163-239-11	CERAMIC CHIP	33PF 5%	50V	
C612	1-163-239-11	CERAMIC CHIP	33PF 5%	50V	
C613	1-126-233-11	ELECT	22uF 20%	50V	
C614	1-126-233-11	ELECT	22uF 20%	50V	
C616	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C617	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C618	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C621	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C622	1-163-038-91	CERAMIC CHIP	0.1uF	25V	
C623	1-124-477-11	ELECT	47uF 20%	25V	
C624	1-163-031-11	CERAMIC CHIP	0.01uF	50V	
C625	1-163-038-91	CERAMIC CHIP	0.1uF	25V	

POWER

Ref. No.	Part No.	Description	Remark
C632	1-163-038-91	CERAMIC CHIP 0.1uF 25V	
⚠C641	1-162-599-12	CERAMIC 0.0047uF 20% 400V	
⚠C642	1-162-599-12	CERAMIC 0.0047uF 20% 400V	
⚠C643	1-162-599-12	CERAMIC 0.0047uF 20% 400V(AEP, UK)	
⚠C644	1-162-599-12	CERAMIC 0.0047uF 20% 400V(AEP, UK)	
⚠C645	1-162-599-12	CERAMIC 0.0047uF 20% 400V(AEP, UK)	
		< CONNECTOR >	
CN501	1-770-203-11	CONNECTOR, FFC/FPC 22P	
* CN611	1-564-708-11	PIN, CONNECTOR (SMALL TYPE) 6P	
* CN631	1-565-561-11	PIN, CONNECTOR 3P (AU BUS)	
CN641	1-580-230-11	PIN, CONNECTOR (PC BOARD) 3P	
		< DIODE >	
D501	8-719-200-02	DIODE 10E2 (JE, SP)	
D501	8-719-210-33	DIODE EC10DS2 (AEP, UK)	
D502	8-719-200-02	DIODE 10E2 (JE, SP)	
D502	8-719-210-33	DIODE EC10DS2 (AEP, UK)	
D503	8-719-200-02	DIODE 10E2 (JE, SP)	
D503	8-719-210-33	DIODE EC10DS2 (AEP, UK)	
D504	8-719-200-02	DIODE 10E2 (JE, SP)	
D504	8-719-210-33	DIODE EC10DS2 (AEP, UK)	
D505	8-719-200-02	DIODE 10E2 (JE, SP)	
D505	8-719-210-33	DIODE EC10DS2 (AEP, UK)	
D506	8-719-422-43	DIODE MA8051-H	
D521	8-719-200-02	DIODE 10E2 (JE, SP)	
D521	8-719-210-33	DIODE EC10DS2 (AEP, UK)	
D522	8-719-200-02	DIODE 10E2 (JE, SP)	
D522	8-719-210-33	DIODE EC10DS2 (AEP, UK)	
D523	8-719-016-74	DIODE 1SS352	
D531	8-719-016-74	DIODE 1SS352	
D532	8-719-210-39	DIODE EC10QS-04	
D533	8-719-210-39	DIODE EC10QS-04	
D536	8-719-016-74	DIODE 1SS352	
D537	8-719-016-74	DIODE 1SS352	
D551	8-719-016-74	DIODE 1SS352	
D552	8-719-016-74	DIODE 1SS352	
D581	8-719-820-05	DIODE 1SS181	
D582	8-719-016-74	DIODE 1SS352	
		< PLATE >	
* EB501	4-962-200-01	PLATE (TR), GROUND	
		< IC >	
IC501	8-759-633-42	IC M5293L	
IC511	8-759-274-37	IC BA3963	
IC521	8-759-233-64	IC TC74HCU04AF	
IC531	8-759-327-15	IC M62005L	
IC541	8-759-504-46	IC PQ05RF1	
IC551	8-759-520-49	IC PQ30RV21	

Ref. No.	Part No.	Description	Remark
IC561	8-759-631-40	IC M5294P	
IC571	8-759-700-94	IC NJM5532M	
IC621	8-759-242-85	IC TOTX176 (DIGITAL OUT)	
IC622	8-759-242-84	IC TORX176 (DIGITAL IN)	
IC623	8-759-243-22	IC TC7SU04F	
		< JACK >	
* J581	1-573-520-31	JACK, PIN 4P (LINE IN/OUT)	
		< COIL/FERRITE BEAD >	
L621	1-543-962-21	BEAD, FERRITE (CHIP)	
L622	1-410-389-31	INDUCTOR CHIP 47uH	
L623	1-410-389-31	INDUCTOR CHIP 47uH	
L631	1-543-962-21	BEAD, FERRITE (CHIP)	
L632	1-543-962-21	BEAD, FERRITE (CHIP)	
L633	1-543-963-21	BEAD, FERRITE (CHIP)	
L635	1-216-295-00	CONDUCTOR, CHIP	
L636	1-216-295-00	CONDUCTOR, CHIP	
		< LINE FILTER >	
⚠LF641	1-424-485-11	FILTER, LINE	
		< TRANSISTOR >	
Q531	8-729-807-87	TRANSISTOR 2SB1295-UL6	
Q532	8-729-421-19	TRANSISTOR UN2213	
Q551	8-729-901-06	TRANSISTOR DTA144EK	
Q581	8-729-901-06	TRANSISTOR DTA144EK	
Q583	8-729-107-46	TRANSISTOR 2SC3624A-L15	
Q584	8-729-107-46	TRANSISTOR 2SC3624A-L15	
Q585	8-729-107-46	TRANSISTOR 2SC3624A-L15	
Q586	8-729-107-46	TRANSISTOR 2SC3624A-L15	
Q631	8-729-901-06	TRANSISTOR DTA144EK	
Q632	8-729-421-19	TRANSISTOR UN2213	
Q633	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
		< RESISTOR >	
R504	1-216-025-11	METAL CHIP 100 5% 1/10W	
R505	1-216-025-11	METAL CHIP 100 5% 1/10W	
R506	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R521	1-216-025-11	METAL CHIP 100 5% 1/10W	
R522	1-216-049-11	METAL CHIP 1K 5% 1/10W	
R523	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R523	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R524	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R525	1-216-109-00	METAL CHIP 330K 5% 1/10W	
R526	1-216-049-11	METAL CHIP 1K 5% 1/10W	
R531	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R532	1-216-049-11	METAL CHIP 1K 5% 1/10W	
R533	1-216-170-00	METAL CHIP 68 5% 1/8W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

POWER

Ref.No.	Part No.	Description				Remark
R534	1-216-170-00	METAL CHIP	68	5%	1/8W	
R535	1-216-295-00	METAL CHIP	0	5%	1/10W	
R551	1-208-806-11	METAL CHIP	10K	0.50%	1/10W	
R552	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R553	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R554	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R561	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R571	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R572	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R573	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R574	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R575	1-216-105-11	METAL CHIP	220K	5%	1/10W	
R576	1-216-105-11	METAL CHIP	220K	5%	1/10W	
R577	1-216-037-00	METAL CHIP	330	5%	1/10W	
R578	1-216-037-00	METAL CHIP	330	5%	1/10W	
R579	1-216-037-00	METAL CHIP	330	5%	1/10W	
R580	1-216-037-00	METAL CHIP	330	5%	1/10W	
R582	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R583	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R584	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R585	1-216-037-00	METAL CHIP	330	5%	1/10W	
R586	1-216-037-00	METAL CHIP	330	5%	1/10W	
R587	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R588	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R603	1-216-017-00	METAL CHIP	47	5%	1/10W	
R604	1-216-017-00	METAL CHIP	47	5%	1/10W	
R605	1-216-017-00	METAL CHIP	47	5%	1/10W	
R606	1-216-017-00	METAL CHIP	47	5%	1/10W	
R617	1-216-001-00	METAL CHIP	10	5%	1/10W	
R618	1-216-001-00	METAL CHIP	10	5%	1/10W	
R619	1-208-814-11	METAL CHIP	22K	0.50%	1/10W	
R620	1-208-814-11	METAL CHIP	22K	0.50%	1/10W	
R621	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R622	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R623	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R625	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R631	1-216-001-00	METAL CHIP	10	5%	1/10W	
R632	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R633	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R634	1-216-089-00	METAL CHIP	47K	5%	1/10W	

< SWITCH >

⚠S901	1-572-675-11	SWITCH, POWER VOLTAGE CHANGE (VOLTAGE SELECTOR) (JE, SP)

< TRANSFORMER >

⚠TR641	1-427-898-11	POWER TRANSFORMER (AEP, UK)
⚠TR641	1-427-899-11	POWER TRANSFORMER (JE, SP)

****

Ref.No.	Part No.	Description	Remark
		MISCELLANEOUS	
		**********	
25	1-769-122-11	WIRE (FLAT TYPE) (22 CORE)	
52	1-769-119-11	WIRE (FLAT TYPE) (18 CORE)	
53	1-769-118-11	WIRE (FLAT TYPE) (30 CORE)	
54	1-769-125-11	WIRE (FLAT TYPE) (22 CORE)	
⚠64	1-696-586-11	CORD, POWER (UK)	
⚠65	1-751-621-21	CORD, POWER (JE)	
⚠66	1-575-651-21	CORD, POWER (AEP, SP)	
⚠69	1-569-007-11	ADAPTER, CONVERSION 2P (JE)	
⚠70	1-569-008-11	ADAPTER, CONVERSION 2P (SP)	
153	1-654-446-11	OWH FLEXIBLE BOARD	
⚠157	8-583-009-11	DEVICE, MINI DISK KMS-210A/J-N	
HR901	1-500-175-11	HEAD, OVER LIGHT (RF322-74A)	
M101	A-4660-651-A	MOTOR ASSY (SLED)	
M102	A-4660-650-A	CHASSIS ASSY BU (SPINDLE)	
M191	A-4660-646-A	MOTOR ASSY (LOADING)	
S102	1-762-148-11	SWITCH, PUSH (2 KEY) (REFLECT/PROTECT)	
⚠TR641	1-427-898-11	TRANSFORMER, POWER (AEP, UK)	
⚠TR641	1-427-899-11	TRANSFORMER, POWER (JE, SP)	

****

ACCESSORIES & PACKING MATERIALS

****

1-473-028-11	REMOTE COMMANDER (RM-D3M)
1-574-264-11	CORD, LIGHT PLUG
1-574-314-11	CORD (WITH CONNECTOR)
1-590-925-31	CORD, CONNECTION
3-363-099-21	SCREW (CASE 3 TP2)
3-707-584-21	COVER, BATTERY (FOR RM-D3M)
3-759-629-11	MANUAL, INSTRUCTION (ENGLISH, FRENCH, SPANISH, PORTUGUESE)
3-759-629-41	MANUAL, INSTRUCTION (GERMAN, DUTCH, SWEDISH, ITALIAN) (AEP)
3-759-629-51	MANUAL, INSTRUCTION (CHINESE) (JE, SP)
4-968-991-11	CUSHION
4-971-338-11	INDIVIDUAL CARTON (AEP, UK)
4-971-338-21	INDIVIDUAL CARTON (JE, SP)
X-4945-464-1	SCREW ASSY (4)

****

****

HARDWARE LIST

****

#1	7-621-775-20	SCREW +B 2.6X5
#2	7-627-852-08	SCREW, PRECISION +P 1.7X2.5
#3	7-682-548-09	SCREW +BVTT 3X8 (S)
#4	7-685-104-19	SCREW +P 2X6 TYPE2 NON-SLIT
#5	7-685-105-19	TPG +P 2X8, TYPE 2, NON-SLIT

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
#6	7-685-533-19	SCREW +BTP 2.6X6 TYPE2 N-S	
#7	7-685-645-79	SCREW +BVTP 3X6 TYPE2 N-S	
#8	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
#9	7-685-650-79	SCREW +BVTP 3X16 TYPE2 N-S	

English
95B0963-1
Printed in Japan
© 1995. 2
Published by Home A&V Products Div.
Quality Engineering Dept.

9-959-839-11

Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

MDS-S1

SONY
SERVICE MANUAL

AEP Model
UK Model
Singapore Model
Tourist Model

SUPPLEMENT-1

File this supplement with the service manual.

Subject : 1. TEST MODE
2. ELECTRICAL ADJUSTMENT
3. BLOCK DIAGRAM

There are some mistakes for the panel name of CLOCK SET.

Please correct the followings.

Page	INCORRECT	CORRECT
3	[18] CLOCK SET button	[18] SCROLL button
46	S763 [CLOCK SET]	S763 [SCROLL]
49	S763 [CLOCK SET]	S763 [SCROLL]
63	S763 SWITCH, TACTILE (CLOCK SET)	S763 SWITCH, TACTILE (SCROLL)

9-959-839-82

Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

English
95D0967-1
Printed in Japan
© 1995. 4
Published by Home A&V Products Div.
Quality Engineering Dept.

SECTION 1
TEST MODE

1-1. Setting the Test Mode

While pressing the AMS knob, insert the power plug into the power supply inlet, and release the AMS knob.

1-2. Exiting the Test Mode

Disconnect the power plug from the power supply inlet.

1-3. Basic Operations of the Test Mode

All operations are performed using the AMS knob, YES key, and NO key.
The functions of these keys are as follows.

Function	Contents
AMS knob	Changes parameters and modes
YES key	Proceeds onto the next step. Finalizes input.
NO key	Returns to previous step. Stops operations.

1-4. Selecting the Test Mode

Eight test modes are selected by turning the AMS knob.

Display	Contents
TEMP ADJUST	Temperature compensation offset adjustment
LDPWR ADJUST	Laser power adjustment
EFBAL ADJUST	Traverse adjustment
FBIAS ADJUST	Focus bias adjustment
FBIAS CHECK	Focus bias check
CPLAY MODE	Continuous playback mode
CREC MODE	Continuous recording mode
EEP MODE	Non-volatile memory mode *

For detailed description of each adjustment mode, refer to 2. Electrical Adjustments.
If a different adjustment mode has been selected by mistake, press the NO key to exit from it.
* The EEP MODE is not used in servicing. If set accidentally, press the NO key immediately to exit it.

1-4-1. Operating the Continuous Playback Mode

1. Entering the continuous playback mode
   ① Set the disc in the unit (either MO or CD).
   ② Rotate the AMS knob and display "CPLAY MODE".
   ③ Press the YES key to change the display to "CPLAYIN".
   ④ When access completes, the display changes to "CPLAY (□□□□)".
   Note : The "□" displayed are arbitrary numbers.
2. Changing the parts to be played back
   ① Press the YES key during continuous playback to change the display to "CPLY MID", "CPLAY OUT". When pressed another time, the parts to be played back can be changed.
   ② When access completes, the display changes to "CPLAY (□□□□)".
   Note : The "□" displayed are arbitrary numbers.
3. Ending the continuous playback mode
   ① Press the NO key. The display will change to "CPLY MODE".
   ② Press the EJECT key and remove the disc.
   Note 1 : The playback start addresses for IN, MID, and OUT are as follows.
   IN 40h cluster
   MID 300h cluster
   OUT 700h cluster

1-4-2. Operating the Continuous Recording Mode

1. Entering the continuous recording mode
   ① Set the MO disc in the unit.
   ② Rotate the AMS knob and display "CREC MODE".
   ③ Press the YES key to change the display to "CREC IN".
   ④ When access completes, the display changes to "CREC (□□□□)" and **REC** lights up.
   Note : The "□" displayed are arbitrary numbers.
2. Changing the parts to be recorded
   ① When the YES key is pressed during continuous recording, the display changes to "CREC MID", "CREC OUT" and **REC** goes off.
   When pressed another time, the parts to be recorded can be changed.
   ② When access completes, the display changes to "CREC (□□□□)" and **REC** lights up.
   Note : The "□" displayed are arbitrary numbers.
3. Ending the continuous recording mode
   ① Press the NO key. The display changes to "CREC MODE" and **REC** goes off.
   ② Press the EJECT key and remove the disc.
   Note 1 : The recording start addresses for IN, MID, and OUT are as follows.
   IN 40h cluster
   MID 300h cluster
   OUT 700h cluster
   Note 2 : The NO key can be used to stop recording anytime.
   Note 3 : During the test mode, the erasing-protection tab will not be detected. Therefore be careful not to set the continuous recording mode when a disc not to be erased is set in the unit.
   Note 4 : Do not perform continuous recording for long periods of time above 5 minutes.
   Note 5 : During continuous recording, be careful not to apply vibration.

1-4-3. Non-Volatile Memory Mode

This mode reads and writes the contents of the non-volatile memory.
It is not used in servicing. If set accidentally, press the NO key immediately to exit it.

1-5. Functions of Other keys

Function	Contents
▷ II	Sets continuous playback when pressed in the STOP state. When pressed during continuous playback, the tracking servo turns ON/OFF.
■	Stops continuous playback and continuous recording.
►►	The sled moves to the outer circumference only when this is pressed.
◄◄	The sled moves to the inner circumference only when this is pressed.
●	Turns recording ON/OFF when pressed during continuous playback.
SCROLL	Switches between the pit and groove modes when pressed.
PLAY MODE	Switches the spindle servo mode (CLVS and A).
DISPLAY	Switches the display when pressed.Returns to previous step. Stops operations.

Note : The erasing-protection tab is not detected during the test mode. Recording will start regardless of the position of the erasing-protection tab when the ● (REC) key is pressed.

1-6. Test Mode Displays

Each time the DISPLAY key is pressed, the display changes in the following order.

MODE display→Address display→Error rate display

1. MODE display
   Displays "TEMP ADJUST", "CPLAY MODE", etc.
2. Address display
   Addresses are displayed as follows.
   h = [XXX] s = [XXX] (MO pit and CD)
   h = [XXX] a = [XXX] (MO groove)
   h = : Header address
   s = : SUBQ address
   a = : ADIP address
   * is displayed when the address cannot be read.
3. Error rate display
   Error rates are displayed as follows.
   C1 = [XXX] AD = [XXX]
   C1 = : Indicates C1 error
   AD= : Indicates ADER

1-7. Meanings of Other Displays

Display	Contents		
	Light	Off	Blinking
►	During continuous playback	STOP	
II	Tracking servo OFF	Tracking servo ON	
REC	Recording mode ON	Recording mode OFF	
CLOCK	CLV LOCK	CLV UNLOCK	
TRACK	Pit	Groove	
DISC	High reflection	Low reflection	
DATE	CLV-S	CLV-A	
A. SPACE	ABCD adjustment completed		
A – B	(Focus auto gain successful Tracking auto gain successful)		(Focus auto gain successful Tracking auto gain failed)

1-8. Precautions for Use of Test Mode

① As loading related operations will be performed regardless of the test mode operations being performed, be sure to check that the disc is stopped before setting and removing it.
Even if the EJECT key is pressed while the disc is rotating during continuous playback, continuous recording, etc., the disc will not stop rotating.
Therefore, it will be ejected while rotating.
Always press the NO key first before pressing the EJECT key.

② The erasing-protection tab is not detected in the test mode. Therefore, when modes which output the recording laser power such as continuous recording mode and traverse adjustment mode, etc. are set, the recorded contents will be erased regardless of the position of the tab. When using a disc that is not to be erased in the test mode, be careful not to enter the continuous recording mode and traverse adjustment mode.

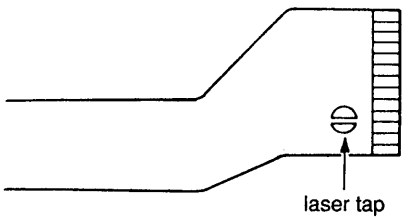
SECTION 2.
ELECTRICAL ADJUSTMENTS

2-1. Precautions for Checking Laser Diode Emission

To check the emission of the laser diode during adjustments, never view directly from the top as this may lose your eye-sight.

2-2. Precautions for Use of optical pickup (KMS-210A)

As the laser diode in the optical pickup is easily damaged by static electricity, solder the laser tap of the flexible board when using it. Before disconnecting the connector, desolder first. Before connecting the connector, be careful not to remove the solder. Also take adequate measures to prevent damage by static electricity. Handle the flexible board with care as it breaks easily.



Optical pickup flexible board

2-3. Precautions for Adjustments

1) When replacing the following parts, perform the adjustments and checks with O in the order shown in the following table.

	Optical Pickup	BD Board		
		IC171	D101	IC101, IC121, IC191
1. Temperature compensation offset adjustment	X	O	O	O
2. Laser power adjustment	O	X	X	O
3. Traverse adjustment	O	O	X	O
4. Focus bias adjustment	O	O	X	O
5. Error rate check	O	O	X	O

2) Set the test mode when performing adjustments. After completing the adjustments, exit the test mode.
3) Perform the adjustments in the order shown.
4) Use the following tools and measuring devices.
   • CD test disc TDYS-1 (Parts No. 4-963-646-01)
   • Laser power meter LPM-8001 (Parts No. J-2501-046-A)
   • Oscilloscope
   • Digital voltmeter
   • Thermometer
5) When observing several signals on the oscilloscope, etc., make sure that VC and GND do not connect inside the oscilloscope.
   (VC and GND will become short-circuited.)
6) Do not move RV105 of the BD board. When replacing it, adjust to the mechanical center of the semi-fixed resistor.

2-4. Creating MO Continuously Recorded Disc

* This disc is used in focus bias adjustment and error rate check. The following describes how to create a MO continuous recording disc.

1. Insert a MO disc (blank disc) commercially available.
2. Rotate the AMS knob and display "CREC MODE".
3. Press the YES key and display "CREC IN".
4. Press the YES key again to display "CREC MID". "CREC (0300)" is displayed for a moment and recording starts.
5. Complete recording within 5 minutes.
6. Press the NO key and stop recording .
7. Press the EJECT key and remove the MO disc.

The above has been how to create a continuous recording data for the focus bias adjustment and error rate check.

Note :

• Be careful not to apply vibration during continuous recording.

2-5. Temperature Compensation Offset Adjustment

Save the temperature data at that time in the non-volatile memory as 25 °C reference data.

Note :

1. Usually, do not perform this adjustment.
2. Perform this adjustment in an ambient temperature of 22 °C to 28 °C. Perform it immediately after the power is turned on when the internal temperature of the unit is the same as the ambient temperature.
3. When D101 has been replaced, perform this adjustment after the temperature of this part has become the ambient temperature.

Adjusting Method :

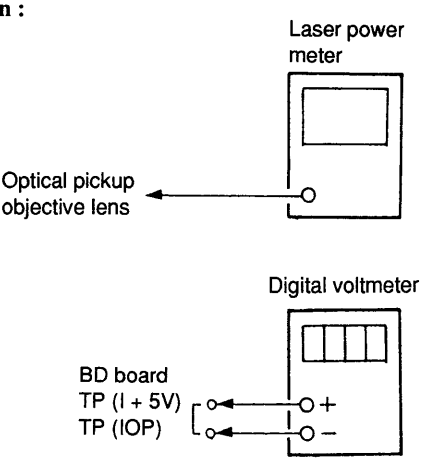
1. Rotate the AMS knob and display "TEMP ADJUST".
2. Press the YES key and select the "TEMP ADJUST" mode.
3. "TEMP = ▯▯" and the current temperature data will be displayed.
4. To save the data, press the YES key.
   When not saving the data, press the NO key.
5. When the YES key is pressed, "TEMP = ▯▯ SAVE" will be displayed for some time, followed by "TEMP ADJUST".
   When the NO key is pressed, "TEMP ADJUST" will be displayed.

Specifications :

The temperature should be within "TEMP = E0" and "TEMP = 1F".

2-6. Laser Power Adjustment

Connection :

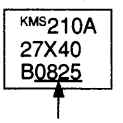


Adjusting Method :

1. Set the laser power meter on the objective lens of the optical pickup. (When it cannot be set properly, press the ◄◄ key or ►► key and move the optical pickup.)
   Connect the digital volt meter to TP (IOP) and TP (I+5V).
2. Rotate the AMS knob and display "LDPWRADJUST".
   (Laser power : For adjustment)
3. Press the YES key twice and display "LD $ 4B = 3.5 mW".
4. Adjust RV102 of the BD board so that the reading of the laser power meter becomes $3.4^{+0.1}_{-0}$ mW.
5. Press the YES key and display "LD $ 96 = 7.0 mW".
   (Laser power:MO reading)
6. Check that the laser power meter and digital voltmeter readings satisfy the specified value.

   Specification :
   Laser power meter reading : 7.0 ± 0.3 mW
   Digital voltmeter reading : Optical pickup displayed value ± 10%

   (Optical pickup label)

   Iop = 82.5 mA in this case
   Iop (mA) = Digital voltmeter reading (mV)/ 1 (Ω)

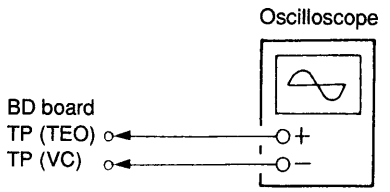
7. Press the YES key and display "LD $ 0F = 0.7 mW".
   (Laser power:MO reading)
8. Check that the laser power meter at this time satisfies the specified value.

   Specification :
   Laser power meter reading : 0.70 ± 0.1 mW

9. Press the NO key and display "LDPWR ADJUST', and stop laser emission.
   (The NO key is effective at all times to stop the laser emission.)

2-7. Traverse Adjustment

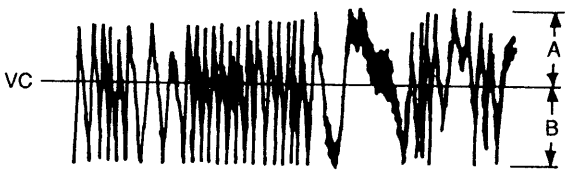
Connection :



Adjusting method :

1. Connect an oscilloscope to TP (TEO) and TP (VC) of the BD board.
2. Load a MO disc (any available on the market).
3. Press the ◄◄ key or ►► key and move the optical pickup outside the pit.
4. Rotate the AMS knob and display "EFBAL ADJUST".
5. Press the YES key and display "EFBAL MO-W". (Laser power WRITE power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)
6. Adjust RV101 of the BD board so that the waveform of the oscilloscope becomes the specified value. (MO groove write power traverse adjustment)

(Traverse Waveform)



Specification A = B

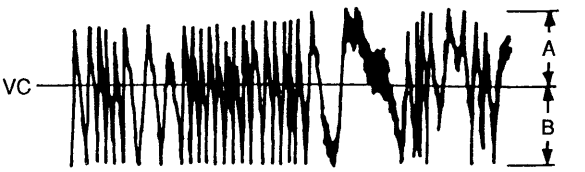
7. Press the YES key and display "EFB = $ ▯ MO-R". (Laser power : MO reading)
8. Rotate the AMS knob so that the waveform of the oscilloscope becomes the specified value. (When the AMS knob is rotated, the ▯ of "EFB- ▯ " changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible. (MO groove read power traverse adjustment)

(Traverse Waveform)

Specification A=B

9. Press the YES key, display "EFB = $ ▯ SAVE" for a moment and save the adjustment results in the non-volatile memory. Next "EFBAL MO-P" is displayed.
10. Press the YES key and display "EFB = $ ▯ MO-P". The optical pickup moves to the pit area automatically and servo is imposed.
11. Rotate the AMS knob until the waveform of the oscilloscope moves closer to the specified value. In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.

(Traverse Waveform)



Specification A=B

12. Press the YES key, display "EFB = ▯ SAVE" for a moment and save the adjustment results in the non-volatile memory. Next "EFBAL CD" is displayed. The disc stops rotating automatically.
13. Press the EJECT key and remove the MO disc.
14. Load the test disc TDYS-1.
15. Press the YES key and display "EFB = ▯ CD". Servo is imposed automatically.
16. Rotate the AMS knob so that the waveform of the oscilloscope moves closer to the specified value. In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.

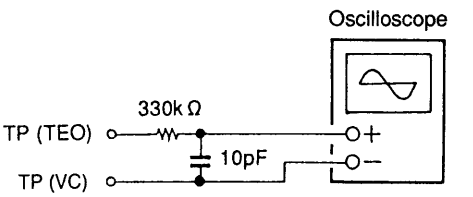
(Traverse Waveform)

Specification A=B

17. Press the YES key, display "EFB = $ ▯ SAVE" for a moment and save the adjustment results in the non-volatile memory. Next "EFBAL ADJUST" is displayed.
18. Press the EJECT key and remove the test disc TDYS-1.

Note 1) Data will be erased during MO reading if a recorded disc is used in this adjustment.

Note 2) If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



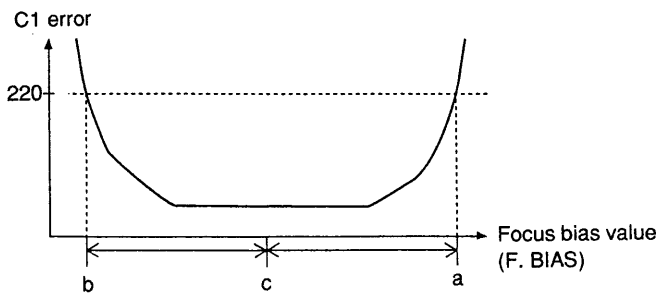
2-8. Focus Bias Adjustment

Adjusting Method :

1. Load a continuously recorded disc (Refer to "2-4. Creating MO Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES key twice and display "CPLAY MID".
4. Press the NO key when "CPLAY (0300)" is displayed.
5. Rotate the AMS knob and display "FBIAS ADJUST".
6. Press the YES key and display " [illegible] a = [illegible]".
   The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [a =] indicate the focus bias value.
7. Rotate the AMS knob in the clockwise direction and find the focus bias value at which the C1 error rate becomes 220.
8. Press the YES key and display " [illegible] b = [illegible]".
9. Rotate the AMS knob in the counterclockwise direction and find the focus bias value at which the C1 error rate becomes 220.
10. Press the YES key and display " [illegible] c = [illegible]".
11. Check that the C1 error rate is below 50 and ADER is 00. Then press the YES key.
12. If the "([illegible])" in "[illegible] - [illegible] - [illegible] ([illegible])" is above 20, press the YES key.
    If below 20, press the NO key and repeat the adjustment from step 2 again.
13. Press the NO key and press the EJECT key to remove the continuously recorded disc.

Note 1: The relation between the C1 error and focus bias is as shown in the following figure. Find points a and b in the following figure using the above adjustment. The focal point position C is automatically calculated from points a and b.

Note 2: As the C1 error rate changes, perform the adjustment using the average vale.



2-9. Error Rate Check

2-9-1. CD Error Rate Check

Checking Method :

1. Load a test disc TDYS-1.
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES key twice and display "CPLAY MID".
4. When "CPLAY (0300)" is displayed, press the DISPLAY key twice and display "C1 = [illegible] AD = [illegible]".
5. Check that the C1 error rate is below 20.
6. Press the NO key, stop playback, press the EJECT key, and remove the test disc.

2-9-2. MO Error Rate Check

Checking Method :

1. Load a continuously recorded disc (Refer to "2-4. Creating MO Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES key twice and display "CPLAY MID".
4. When "CPLAY (0300)" is displayed, press the DISPLAY key twice and display "C1 = [illegible] AD = [illegible]".
5. If the C1 error rate is below 50, check that ADER is 00.
6. Press the NO key, stop playback, press the EJECT key, and remove the continuously recorded disc.

2-10. Focus Bias Check

Change the focus bias and check the focus tolerance amount.

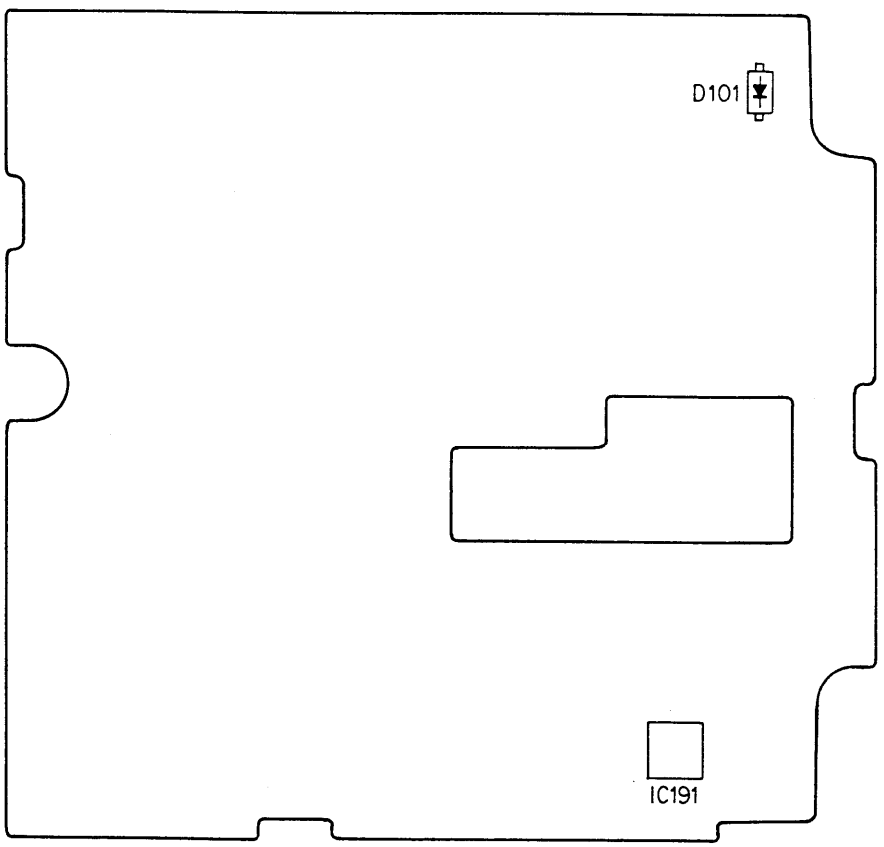
Checking Method :

1. Load a continuously recorded disc (Refer to "2-4. Creating MO Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES key twice and display "CPLAY MID".
4. Press the NO key when "CPLAY (0300)" is displayed.
5. Rotate the AMS knob and display "FBIAS CHECK".
6. Press the YES key and display " [illegible] c = [illegible]".
   The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [c =] indicate the focus bias value.
   Check that the C1 error is below 50 and ADER is 00.
7. Press the YES key and display " [illegible] a = [illegible]".
   Check that the C1 error is not below 220 and ADER is not above 00 every time.
8. Press the YES key and display " [illegible] b = [illegible]".
   Check that the C1 error is not below 220 and ADER is not above 00 every time.
9. Press the NO key, next press the EJECT key, and remove the continuously recorded disc.

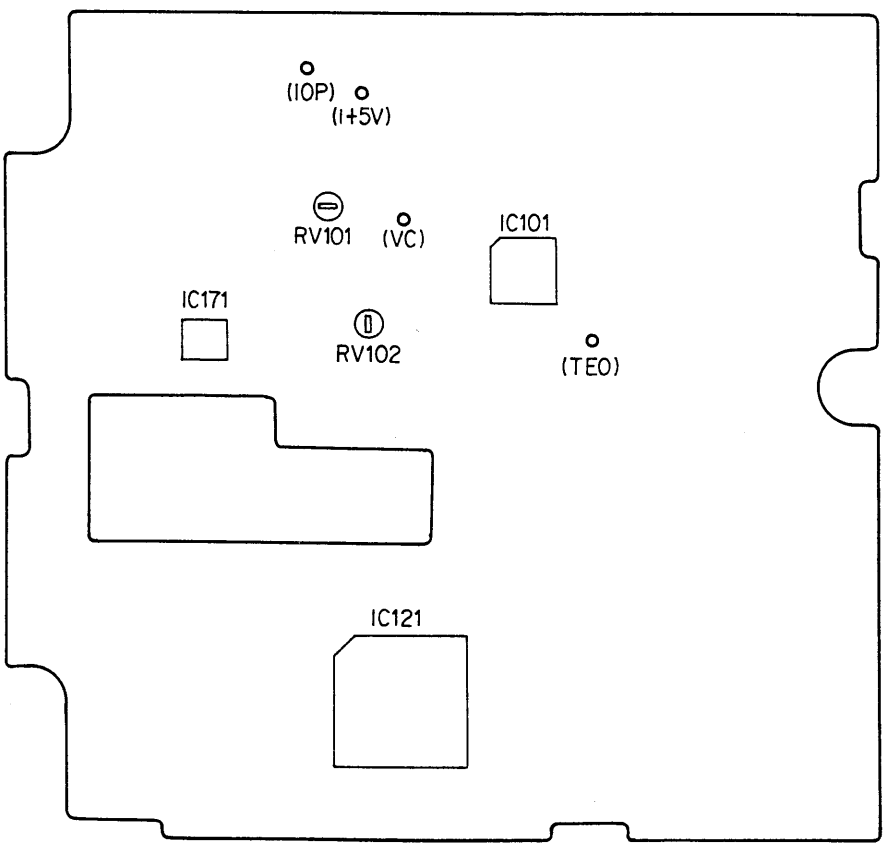
Note 1: If the C1 error and ADER are above 00 at points a or b, the focus bias adjustment may not have been carried out properly. Adjust perform the beginning again.

2-11. Adjusting Points and Connecting Points

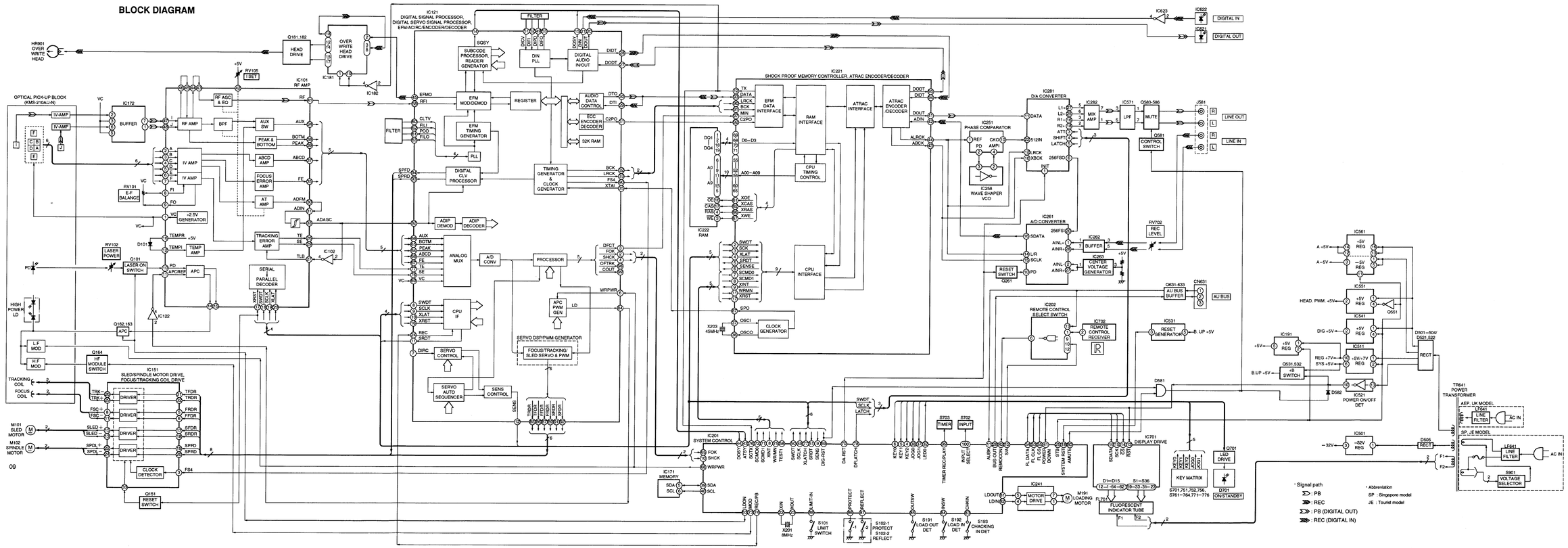
[BD BOARD] (COMPONENT SIDE)



[BD BOARD] (CONDUCTOR SIDE)



SECTION 3
BLOCK DIAGRAM



MDS-S1

SONY

SERVICE MANUAL

AEP Model
UK Model
Singapore Model
Tourist Model

SUPPLEMENT-2

File this supplement with the service manual.

Subject : 1. SERVICE NOTE
2. BD Board change
3. Chenge of the adjustment specification.

(ECN-CD501076)

1. SERVICE NOTE

• Note for replacement of IC121 and IC171 on the BD board

IC121 on the BD board of this unit has modified from CXD2535AR to CXD2535BR due to an improvement.
Some contents of nonvolatile memory in the IC171 are modified according to this modification. When replacing IC171, the previous contents for IC121 (CXD2535AR) are written as an initialized value from the system control IC. (When replacing IC171, turn the power on once to write an initialized value.)
In case the IC171 on the BD board is replaced, which uses CXD2535BR to IC121, see the following procedure to rewrite the contents of nonvolatile memory. As for replacement of IC121, use CXD2535BR to rewrite the contents of IC171.

Table Comparison between CXD2535AR and CXD2535BR regarding the contents of nonvolatile memory

ADDRESS	CXD2535AR	CXD2535BR
15	90	93
2D	33	1A
2E	33	1A

How to rewrite the nonvolatile memory

① Plug in the power plug to an outlet pressing the AMS knob, and release the AMS knob.
② Turn the AMS knob to be displayed "EEP MODE".
If the YES button is pressed, the display will be changed to "EEP ** @@".
(** : Address, @@ : data)
③ Turn the AMS knob to be displayed "EEP 15 @@".
④ If the AMS knob is pressed, "EEP 15 @@ > @@" will be displayed. So turn the AMS knob to be displayed "EEP 15 @@ > 93".
⑤ Pressing the YES button, "Complete!" is displayed once, "EEP 15 93" is displayed, and the data is rewritten.
⑥ As for the address 2D and 2E, rewrite each of them to "1A" following the steps ③ to ⑤ as well.
⑦ After the all modification are complete, press the NO button to be displayed "EEP MODE".
⑧ Press the REPEAT button. In case a disc is unloaded, the display "STANDBY" will be go on and off, then unplug the power plug. In case a disc is loaded, "STANDBY" is displayed once and the disc is ejected. After that, unplug the power plug from an outlet to be out from the EEP rewriting mode. (Refer to **[How to stop test mode]** as below.)
Note : The modification in the contents of nonvolatile memory is not reflected if the power is not turned off once.

[How to stop test mode]

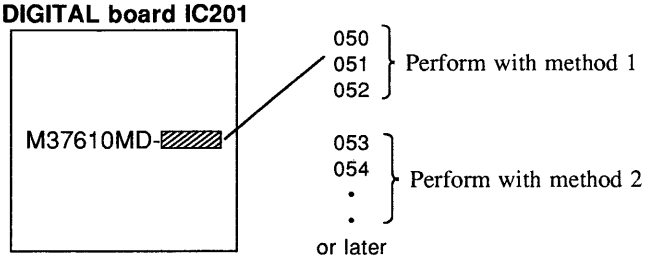
In the previous mentioned text regarding test mode, "to release test mode" is that should be unplug the power plug from an outlet. If the test mode is released in this way, an incorrect operation will rarely occur to the set. So release the test mode according to the followings.

- **Method 1**
  (1) Unplug the power plug from an outlet.
  (2) Short-circuit C532 (condenser for back-up) on the POWER board with a pincette etc., and discharge it.

- **Method 2**
  (1) Press the [REPEAT] button.
  (2) In case a disc is unloaded, the display "STANDBY" will go on and off.
  In case a disc is loaded, the "STANDBY" is displayed once and the disc is ejected.
  (3) Unplug the power plug from an outlet.

- To stop test mode will be different according to a model name of IC201 on the DIGITAL board. Refer to the following "How to discriminate".

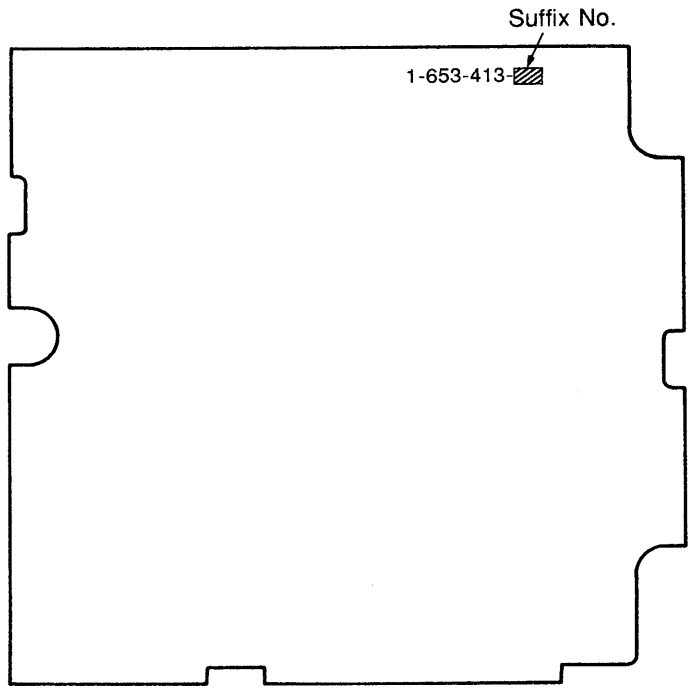
How to discriminate



2. BD Board change

NOTE: Many charge of mounting parts are different between boards which have a suffix No. -[15] or later and which have a suffix No. -[14] or before. Refer to this supplement-3 for boards which have a suffix No. -[15] or later. As for boards which have a suffix No. -[14] or before, refer to the previous issued manual (9-959-839-01).

- **Part No. Location — BD board — (Component side)**



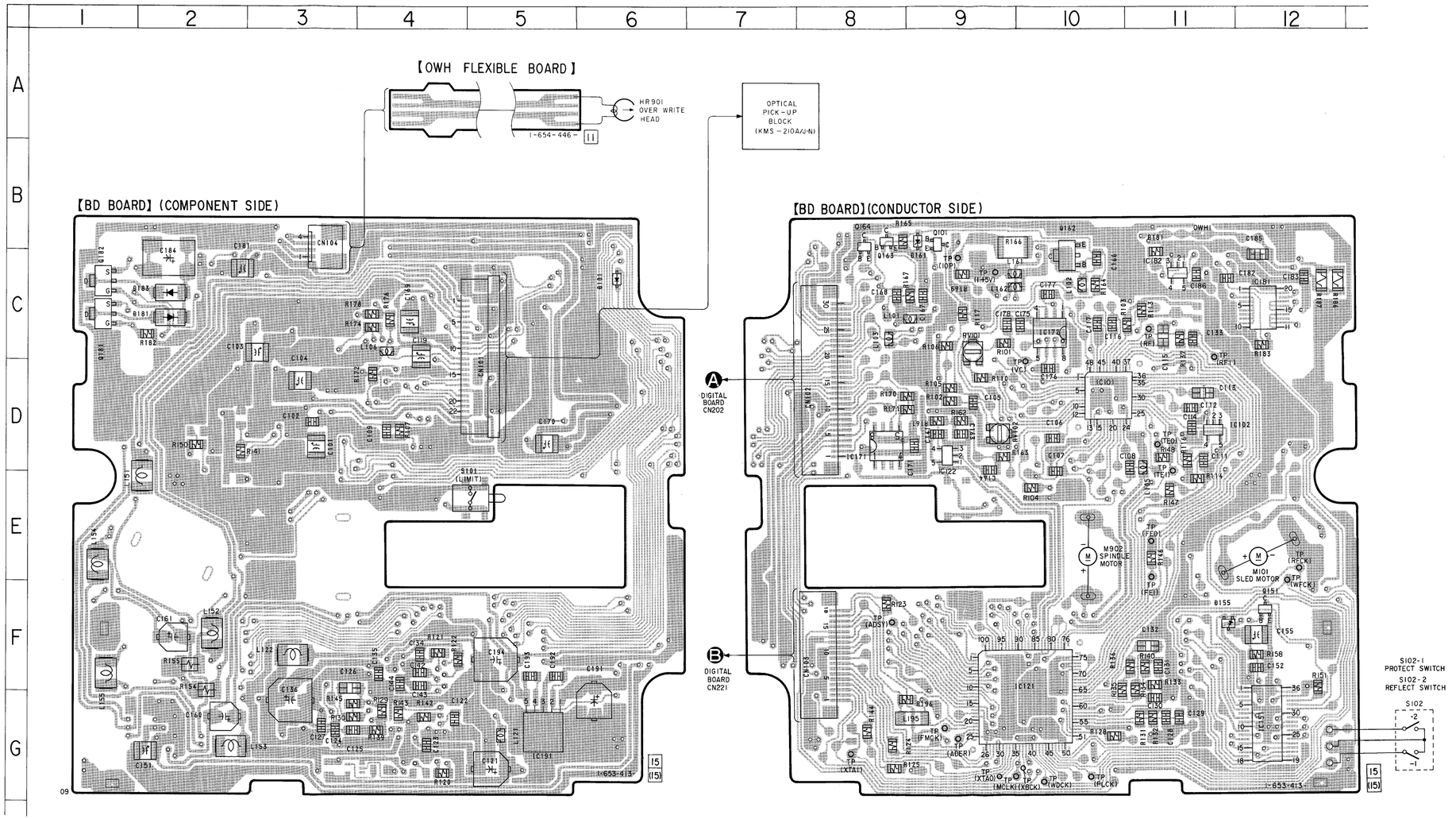
PRINTED WIRING BOARD — RF SECTION —

- **Semiconductor Location**

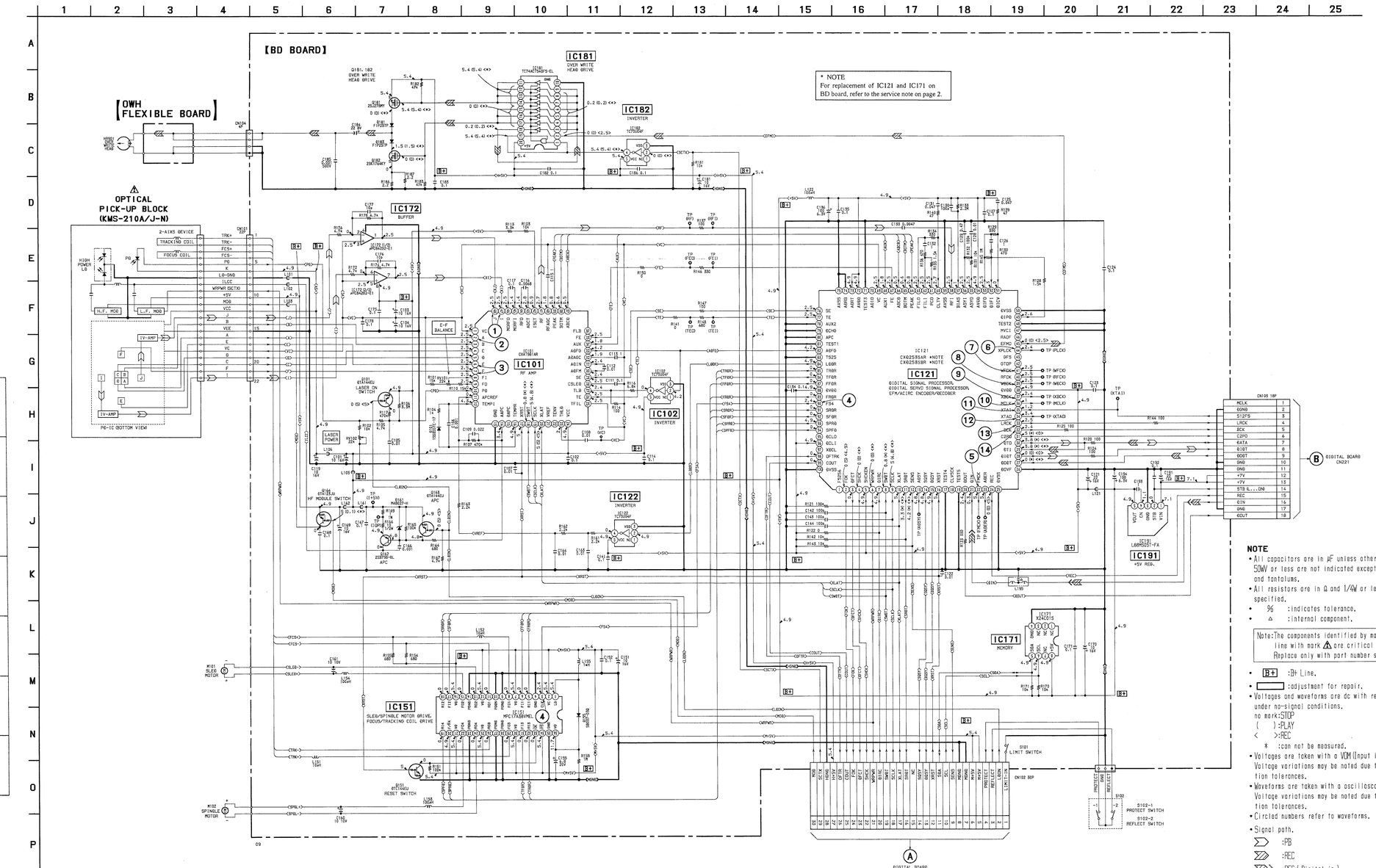
Ref. No.	Location
D101	C-6
D155	F-11
D161	B-8
D181	C-2
D183	C-2
IC101	D-10
IC102	D-11
IC121	F-9
IC122	D-9
IC151	G-12
IC171	D-8
IC172	C-10
IC181	C-12
IC182	C-11
IC191	G-5
Q101	B-9
Q151	F-12
Q162	B-10
Q163	B-8
Q164	B-8
Q181	C-1
Q182	C-1

Note:

- ○—— : parts extracted from the component side.
- —— : parts extracted from the conductor side.
- ○ : Through hole.
- ▒▒ : Pattern from the side which enable seeing. (The other layer's patterns are not indicated.)



SCHEMATIC DIAGRAM — RF SECTION —



• Waveforms

①	IC101 (47)(48) (I, J) APPROX. 0.35Vp-p (PLAY mode)	⑧	5.2Vp-p, 1μsec, IC121 (59) (WDCK)
②	IC101 (2) (A) APPROX. 0.18Vp-p (PLAY mode)	⑨	5.2Vp-p, 0.35μsec, IC121 (57) (XBCK)
③	IC101 (6)(7) (E, F) APPROX. 0.08Vp-p (PLAY mode)	⑩	3.4Vp-p, 46nsec, IC121 (60) (MCLK)
④	5.2Vp-p, 5.8μsec, IC121 (56)(FS4), IC151 (3) (CLK)	⑪	46nsec, 4Vp-p, IC121 (55) (XTAI)
⑤	5.2Vp-p, 0.16msec, IC121 (28) (FMCK)	⑫	3.1Vp-p, 46nsec, IC121 (54) (XTAO)
⑥	5.2Vp-p, 0.23μsec, IC121 (44) (XPLCK)	⑬	5.2Vp-p, 23μsec, IC121 (53) (LRCK)
⑦	5.2Vp-p, 135μsec, IC121 (41) WFCK	⑭	5.2Vp-p, 0.35μsec, IC121 (52) (BCK)

NOTE

- All capacitors are in μF unless otherwise noted. pF: μF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- % : indicates tolerance.
- Δ : internal component.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- B+ : B+ Line.
- : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark: STOP
  ( ): PLAY
  < >: REC
  * : can not be measured.
- Voltages are taken with a VOM (Input impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  : PB
  : REC
  : REC (Digital in)

ELECTRICAL PARTS LIST

BD

NOTE:

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- SEMICONDUCTORS
  In each case, u: μ , for example:
  uA...: μA..., uPA...: μPA..., uPB...: μPB..., uPC...: μPC..., uPD...: μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH

* NOTE
For replacement of IC121 and IC171 on BD board, refer to the service note on page 2.

Ref. No.	Part No.	Description			Remark
*	A-4673-174-A	BD BOARD, COMPLETE **********			
		< CAPACITOR >			
C101	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C102	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C103	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C104	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C105	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C106	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C107	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C108	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C109	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C111	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C112	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C113	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C114	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C115	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C116	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C117	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C119	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C121	1-126-395-11	ELECT	22uF	20%	16V
C122	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C123	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C124	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C125	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C126	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C127	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C128	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C129	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V
C130	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C131	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C132	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C133	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C134	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C135	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C136	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C141	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C142	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C143	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C144	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C151	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C152	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C155	1-104-916-11	TANTAL. CHIP	6.8uF	20%	20V
C160	1-104-601-11	ELECT CHIP	10uF	20%	10V
C161	1-104-601-11	ELECT CHIP	10uF	20%	10V
C163	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C164	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C166	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C167	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C168	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C169	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C170	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C171	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C175	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C176	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C177	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C178	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C181	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C182	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C183	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C184	1-107-836-11	ELECT CHIP	22uF	20%	8V
C185	1-164-611-11	CERAMIC CHIP	0.001uF	10%	500V
C186	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C191	1-126-395-11	ELECT	22uF	20%	16V
C192	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C193	1-164-346-11	CERAMIC CHIP	1uF		16V
C194	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
		< CONNECTOR >			
CN101	1-766-508-11	CONNECTOR, FFC/FPC (ZIF) 22P			
CN102	1-766-510-21	CONNECTOR, FFC/FPC 30P			
CN103	1-766-509-21	CONNECTOR, FFC/FPC 18P			
CN104	1-766-898-21	HOUSING, CONNECTOR(PC BOARD) 4P			
		< DIODE >			
D101	8-719-988-62	DIODE 1SS355			
D155	8-719-031-17	DIODE 1SS322-TE85L			
D161	8-719-421-15	DIODE MA8027-L			
D181	8-719-033-60	DIODE F1P2STP			
D183	8-719-033-60	DIODE F1P2STP			
		< IC >			
IC101	8-752-072-68	IC CXA1981AR			
IC102	8-759-243-19	IC TC7SU04F			
IC121	8-752-375-06	IC CXD2535AR * NOTE			

BD

Ref.No.	Part No.	Description	Remark
IC121	8-752-375-36	IC CXD2535BR * NOTE	
IC122	8-759-243-19	IC TC7SU04F	
IC151	8-759-179-60	IC MPC17A38VMEL	
IC171	8-759-504-12	IC X24C01S * NOTE	
IC172	8-759-149-73	IC uPC842G2	
IC181	8-759-095-65	IC TC74ACT540FS	
IC182	8-759-243-19	IC TC7SU04F	
IC191	8-759-822-99	IC L88MS05T-FA	
		< COIL >	
L101	1-414-234-11	INDUCTOR, FERRITE BEAD	
L102	1-414-234-11	INDUCTOR, FERRITE BEAD	
L103	1-414-234-11	INDUCTOR, FERRITE BEAD	
L105	1-414-234-11	INDUCTOR, FERRITE BEAD	
L106	1-414-234-11	INDUCTOR, FERRITE BEAD	
L121	1-414-234-11	INDUCTOR, FERRITE BEAD	
L122	1-412-039-51	INDUCTOR CHIP 100uH	
L151	1-412-622-51	INDUCTOR 10uH	
L152	1-412-622-51	INDUCTOR 10uH	
L153	1-412-039-51	INDUCTOR CHIP 100uH	
L154	1-412-039-51	INDUCTOR CHIP 100uH	
L155	1-410-980-51	INDUCTOR CHIP 1mH	
L161	1-414-234-11	INDUCTOR, FERRITE BEAD	
L162	1-414-234-11	INDUCTOR, FERRITE BEAD	
L195	1-233-316-21	FILTER, CHIP EMI	
		< TRANSISTOR >	
Q101	8-729-905-12	TRANSISTOR DTA144EU	
Q151	8-729-905-18	TRANSISTOR DTC144EU	
Q162	8-729-101-07	TRANSISTOR 2SB798-DL	
Q163	8-729-905-12	TRANSISTOR DTA144EU	
Q164	8-729-924-19	TRANSISTOR DTA123JU	
Q181	8-729-018-75	TRANSISTOR 2SJ278MY	
Q182	8-729-017-65	TRANSISTOR 2SK1764KY	
		< RESISTOR >	
R101	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R102	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R103	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R104	1-216-049-91	METAL GLAZE 1K 5% 1/10W	
R105	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R106	1-216-133-00	METAL CHIP 3.3M 5% 1/10W	
R107	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R110	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R113	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R114	1-216-025-91	METAL GLAZE 100 5% 1/10W	
R116	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R117	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R120	1-216-025-91	METAL GLAZE 100 5% 1/10W	
R121	1-216-097-91	METAL GLAZE 100K 5% 1/10W	
R122	1-216-295-91	CONDUCTOR, CHIP (2012)	
R123	1-216-037-00	METAL CHIP 330 5% 1/10W	
R124	1-216-025-91	METAL GLAZE 100 5% 1/10W	
R125	1-216-025-91	METAL GLAZE 100 5% 1/10W	
R128	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R129	1-216-037-00	METAL CHIP 330 5% 1/10W	
R130	1-216-041-00	METAL CHIP 470 5% 1/10W	
R131	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R132	1-216-097-91	METAL GLAZE 100K 5% 1/10W	
R133	1-216-129-00	METAL CHIP 2.2M 5% 1/10W	
R134	1-216-037-00	METAL CHIP 330 5% 1/10W	
R135	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R136	1-216-041-00	METAL CHIP 470 5% 1/10W	
R137	1-216-025-91	METAL GLAZE 100 5% 1/10W	
R139	1-216-017-91	METAL GLAZE 47 5% 1/10W	
R140	1-216-017-91	METAL GLAZE 47 5% 1/10W	
R141	1-216-295-91	CONDUCTOR, CHIP (2012)	
R142	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R143	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R144	1-216-025-91	METAL GLAZE 100 5% 1/10W	
R145	1-216-121-91	METAL GLAZE 1M 5% 1/10W	
R146	1-216-037-00	METAL CHIP 330 5% 1/10W	
R147	1-216-025-91	METAL GLAZE 100 5% 1/10W	
R148	1-216-045-00	METAL CHIP 680 5% 1/10W	
R150	1-216-295-91	CONDUCTOR, CHIP (2012)	
R151	1-216-097-91	METAL GLAZE 100K 5% 1/10W	
R154	1-220-262-11	METAL GLAZE 680 5% 1/4W	
R155	1-220-262-11	METAL GLAZE 680 5% 1/4W	
R158	1-216-121-91	METAL GLAZE 1M 5% 1/10W	
R161	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R162	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R163	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R164	1-216-045-00	METAL CHIP 680 5% 1/10W	
R165	1-216-097-91	METAL GLAZE 100K 5% 1/10W	
R166	1-220-250-11	METAL GLAZE 10 5% 1/2W	
R167	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R169	1-219-724-11	METAL CHIP 1 1% 1/4W	
R170	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R171	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R172	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R174	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R176	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R178	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R181	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R182	1-216-089-91	METAL GLAZE 47K 5% 1/10W	
R183	1-216-089-91	METAL GLAZE 47K 5% 1/10W	
R186	1-216-134-00	METAL CHIP 2.2 5% 1/8W	
R187	1-216-134-00	METAL CHIP 2.2 5% 1/8W	

* NOTE
For replacement of IC121 and IC171 on BD board, refer to the service note on page 2.

Ref.No.	Part No.	Description	Remark
		< VARIABLE RESISTOR >	
RV101	1-241-396-11	RES, ADJ, METAL GLAZE 22K	
RV102	1-241-396-11	RES, ADJ, METAL GLAZE 22K	
		< SWITCH >	
S101	1-572-467-31	SWITCH, PUSH (1 KEY)(LIMIT)	

****

Ref.No.	Part No.	Description	Remark

3. Change of the adjustment specifications.

The specification of the previous issued **"Supplement-1 ELECTRICAL ADJUSTMENT"** has been changed as below.

2-5. Temperature Compensation Offset Adjustment

Page	FORMER	NEW
6	**Specifications :** The Temperature should be within "TEMP = E0" and "TEMP = 1F".	**Specifications :** The "TEMP = [illegible]" should be within "E0 – EF", "F0 - FF", "00 - 0F", "10 - 1F" and "20 - 2F".

9-959-839-87

Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

English
95I0957-1
Printed in Japan
© 1995. 9
Published by Home A&V Products Div.
Quality Engineering Dept.